Plastics

DEALING WITH THE MANUFACTURE, USES AND POTENTIALITIES OF PLASTIC MATERIALS

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DETROIT

TECHNOLOGY DEPT

'Mouldrite' urea-type thermosetting moulding powders give robust, brightly coloured opaque or translucent mouldings with an attractive and durable finish. These mouldings are used principally for electrical accessories and for closures and containers—which, being free from taste and smell, can be used for many foodstuffs without fear of contamination.

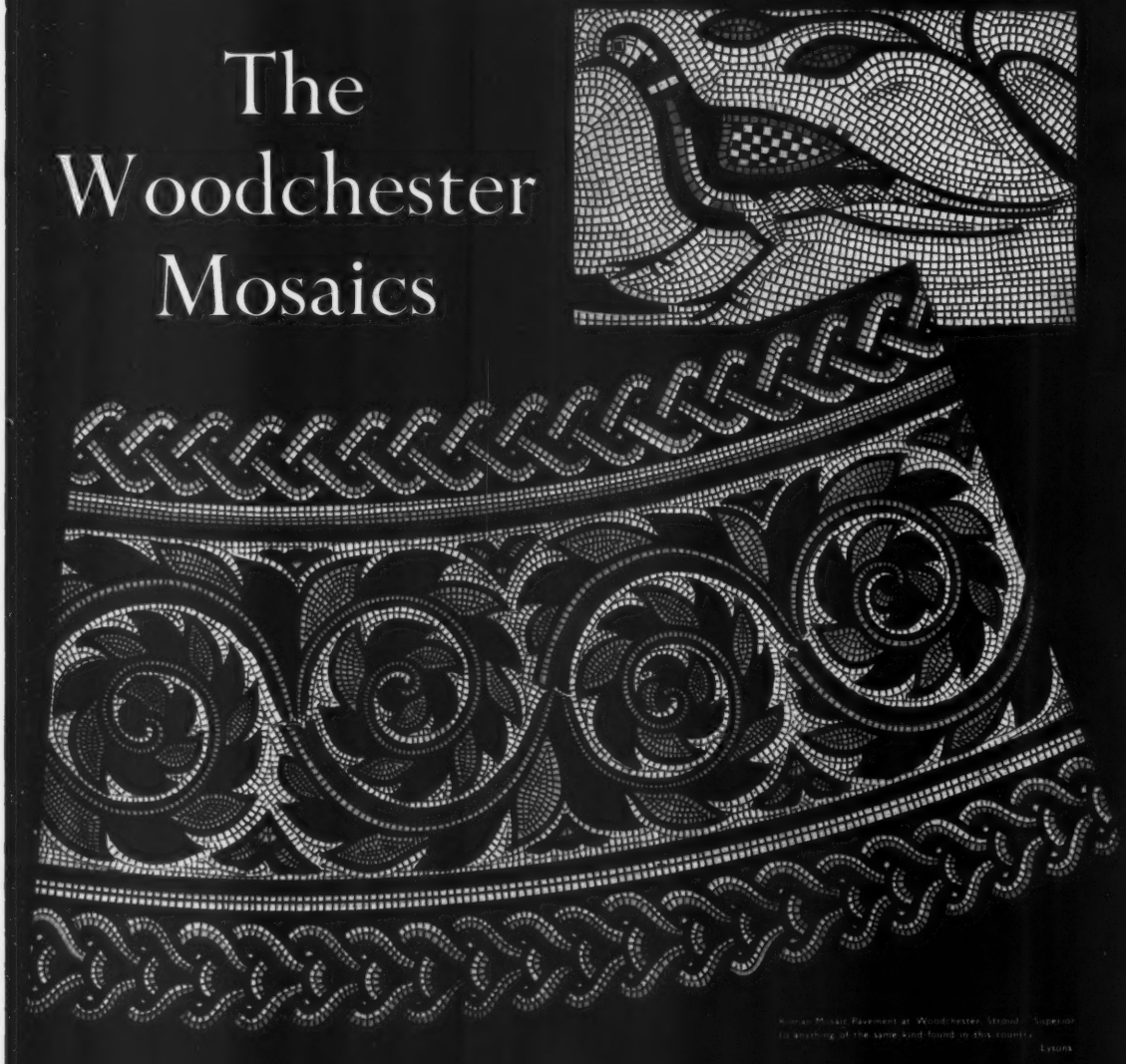
'Mouldrite' is the registered trade mark of moulding powders manufactured by I.C.I.

'MOULDRITE'

IMPERIAL CHEMICAL INDUSTRIES LIMITED
LONDON, S.W.1

ICI

The Woodchester Mosaics

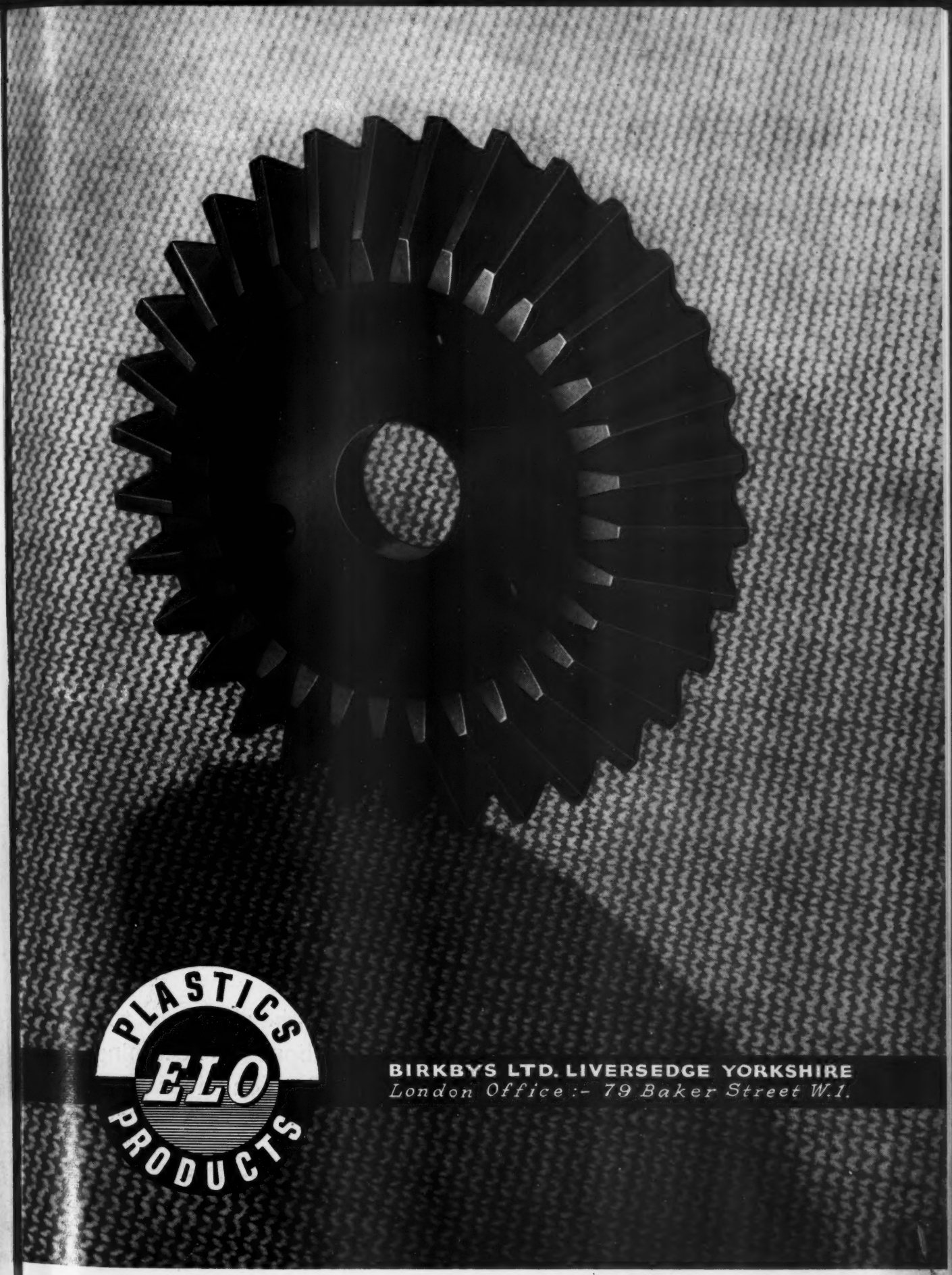


symbolize the skill and fine materials for which the Stroud Valley is famous —from West of England Cloth

to Erinoid Plastics

ERINOID LIMITED
STROUD, GLOS., ENGLAND

ROMAN PAVEMENT OPEN—IULY 10th TO AUGUST 18th



BIRKBYS LTD. LIVERSEDGE YORKSHIRE

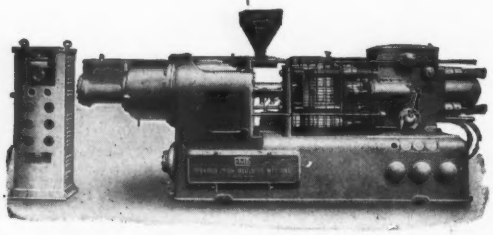
London Office :- 79 Baker Street W.1.

It's like a pair of old shoes

_____gets you where you want with the least discomfort—that's what we're all after.

In terms of injection mouldings the E.M.B. No. 9 machine gives you what you want (good mouldings rapidly produced) with the least discomfort (freedom from breakdown and the maintenance man).

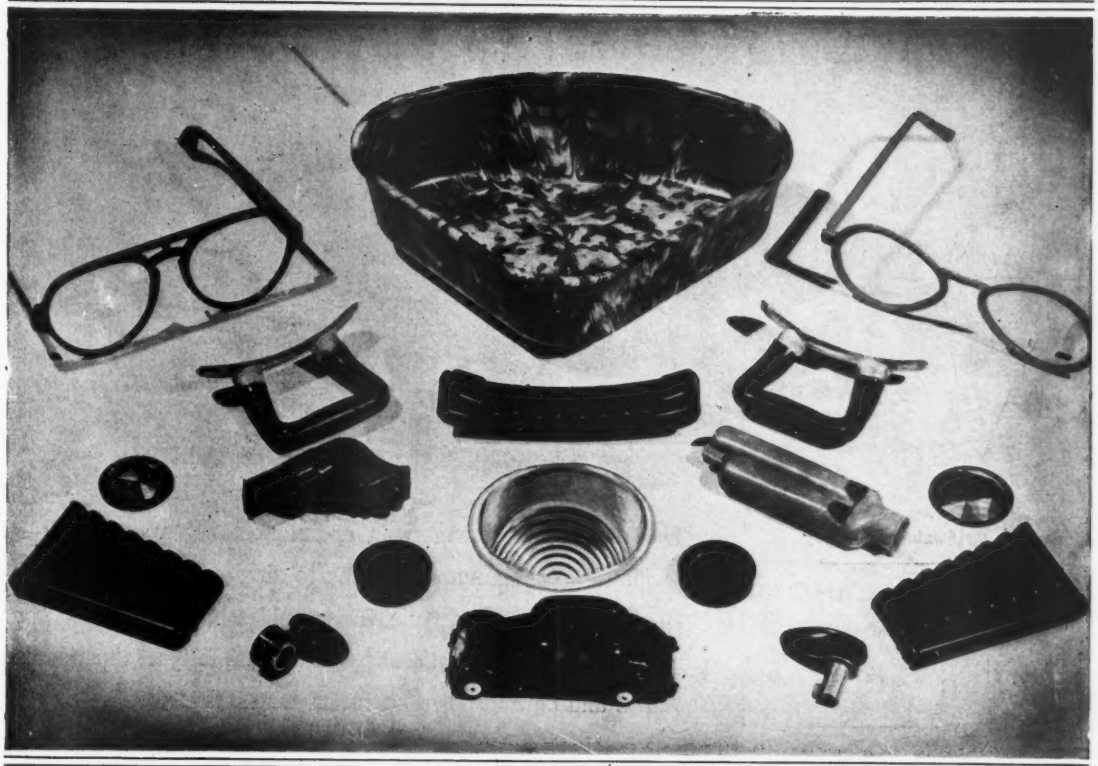
Ask a user—they'll soon tell you!! What about you becoming one too? Our engineers are ready to help.



E.M.B. PATENT No. 9B INJECTION MOULDER

E.M.B. Co. Ltd. WEST BROMWICH ENGLAND

MOULDS



by

UNIVERSAL TOOLS LTD.

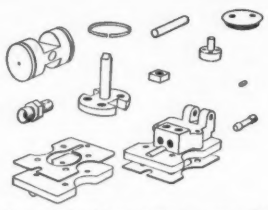
TRAMWAY PATH, MITCHAM, SURREY.

Telephone: MITCHAM 1624, 1625, 1626

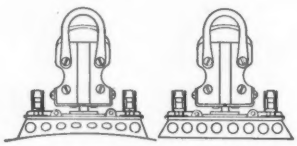
POSITIVELY NO VIBRATION

WITH THE Sundstrand

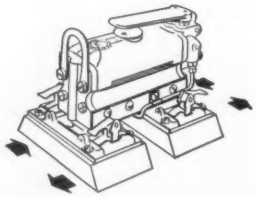
PNEUMATIC SANDER



A few of the 50 precision parts which make up the Sundstrand Sander.



Moulded rubber pads adapt themselves easily to curved surfaces.



Twin reciprocating pads moving to and fro at 3,000 oscillations per minute eliminate vibration—give operator complete control.

The reciprocating twin pads operating at between 2,500—3,500 oscillations per minute (according to air pressure) enable the body to remain completely static. This enables the operator to control the machine — easily, skilfully and without fatigue, thus increasing output and cutting down operating costs.

The precision of manufacture in its 50 working parts makes it cost a little more — but compare it point by point with any other sander in the world and you will realise why its performance is so outstanding.

Sundstrand

PNEUMATIC SANDER

SUNDSTRAND SANDERS LIMITED

NORGREN WORKS, SHIPSTON-ON-STOUR, WARWICKSHIRE. *London Office:* **KENT HOUSE, 87 REGENT ST., LONDON, W.1**

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M-W.150

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* * *

We are manufacturers of Plastic Components for all Government Departments and are approved by A.I.D. and Air Registration Board.

* * *

Our field of activity covers the fabrication of all Plastic Materials—decorative and industrial.

INSULATION EQUIPMENTS Ltd

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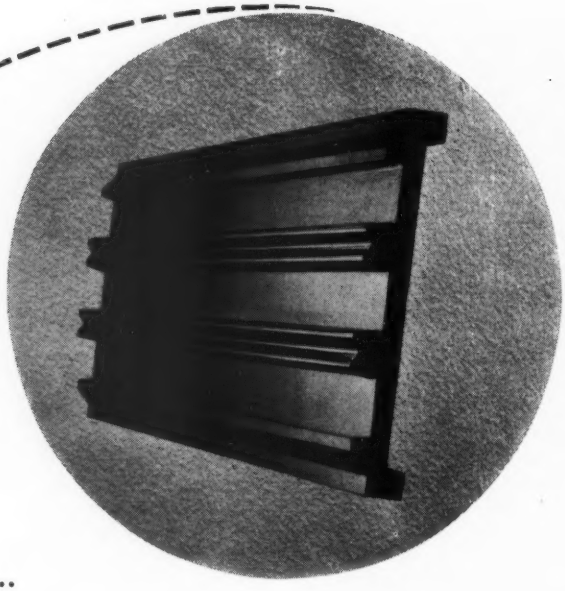
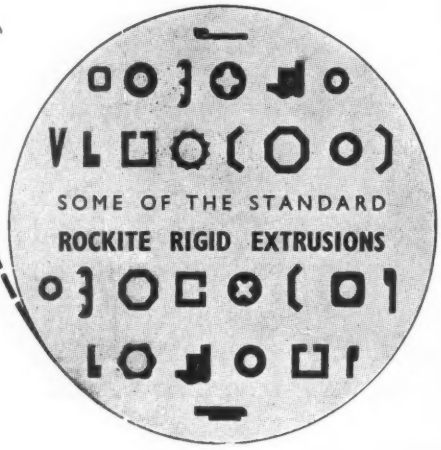


"MORE ACCURATE, LONGER LASTING, CLEANER AND LESS INFLAMMABLE"...

...and so says another ROCKITE user



And so say many others who have claimed Rockite shock resisting phenolic extrusions as a feature of their products. Geo. W. King Ltd., needed a support rail, for their King "Safelec" Busbar System, which had to be light, tough, resistant, durable *and* dimensionally accurate. A Rockite Rigid Extrusion, made exactly to their specification, proved on test to be so successful that they immediately adopted it as a standard fitting in all "Safelec" Systems. But Rockite extrusions can be shaped to countless purposes — wherever constant hard wear or resistance to heat, moisture, alcohol and most acids is required. Obtainable in a variety of colours, Rockite Rigid Extrusions are permanently polished, hygienic and pleasing to the eye and can be produced to almost every design specification. For advice on their possible use in your particular application, just telephone or write to our Sales and Technical Service.

Rockite Rigid Extrusions are also available in an extensive variety of standard shapes to meet the immediate needs of all branches of industry. They are supplied in any lengths, ready to be cut, drilled or machined as required.

ROCKITE RIGID EXTRUSIONS

BRITISH RESIN PRODUCTS LIMITED

BRP

Sales and Technical Service, 21 St. James's Sq., London, S.W.1. Tel: Whitehall 8021 (7 lines)

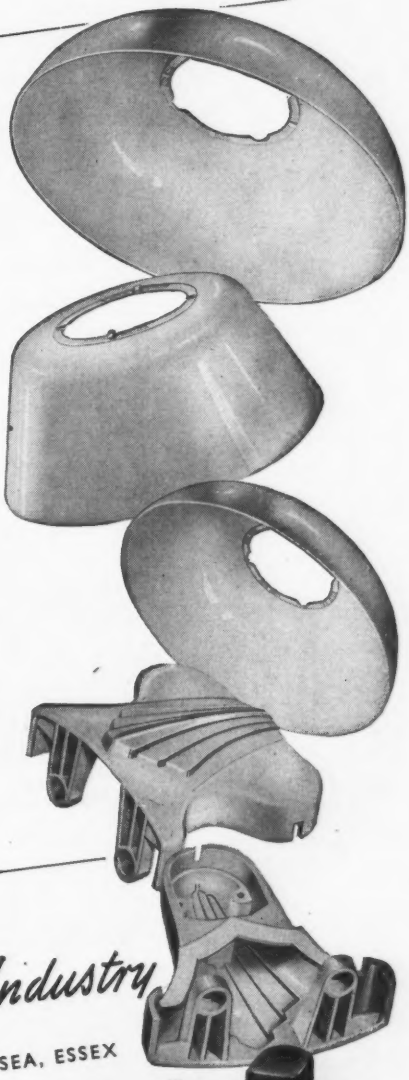
"ROCKITE" IS A REGISTERED TRADE MARK

Many hands make light work!

In any problem involving Plastics, two heads—yours and ours—are better than one. On moulded lighting equipment, for example, we speak with authority, as shown by the plastic shades and accessories illustrated; and being widely experienced in the electrical field we can supplement our design, toolmaking and moulding services with metal parts, assembly, wiring and testing. We have many highly-skilled hands, backed by the most modern plant in the country, to make light work of your moulding needs. Consult Ekco Plastics!

For Fluorescent Lighting — *The End-Caps and Bi-pin Lampholders are moulded in Polystyrene, giving good appearance with stability and sufficient flexibility to hold tight-fitting fluorescent lamps. Starter Switch Sockets, Pantograph Lampholder and Terminal Block moulded in Phenolic.*

For Tungsten Lighting — *Lampshades moulded in Urea in a variety of colours. For a full appreciation of the service we offer send your moulding problems to E. K. Cole Ltd., Plastics Division, Southend-on-Sea.*



EKCO *Plastics for Industry*

E. K. COLE, LTD., (Plastics Division) SOUTHEND-ON-SEA, ESSEX

TURNER *self-contained* PLASTICS PRESSES

The only Press with all these advantages

SELF-CONTAINED: Fitted with a sealed unit hydraulic system which incorporates a compact and efficient high-pressure pump.

VARIABLE PRESSURE: By means of a handwheel on the pump, pressure can be adjusted between the maximum and minimum force specified for each type of press.

SEALED HYDRAULICS: The hydraulic system is wholly contained in a sealed oil tank, and foreign matter is thus completely excluded.

SIMPLICITY OF CONTROL: A single lever controls both upward and downward movements of the ram.

SIMPLE TO INSTALL: To install the press it is only necessary to make one connection to the electric supply.

EASY TO MAINTAIN.

SAFETY IN OPERATION: Mechanically interlocked safety guards prevent the ram being moved unless guards are completely closed. Electrical switchgear and controls totally enclosed.

Entirely new in design and principle of operation, Turner Plastics Presses represent the greatest advance yet made in the production of presses for compression moulding of plastics, deep drawing and other pressing operations. Each press combines the uses of many by providing a range of variable pressures. The larger type gives any required pressure between 25 and 125 tons, the smaller model any pressure between 10 and 50 tons. They are fully self-contained and incorporate a unique hydraulic system which is completely sealed against dust and dirt, but is easily accessible for inspection and maintenance. Compact in construction, Turner Presses enable the greatest productive use to be made of every foot of factory floor space. Fully descriptive literature gladly sent on request.

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B

BIPEL — 12 FEATURE auto-control presses

★ Choice of triple press tonnage from constant line pressure.
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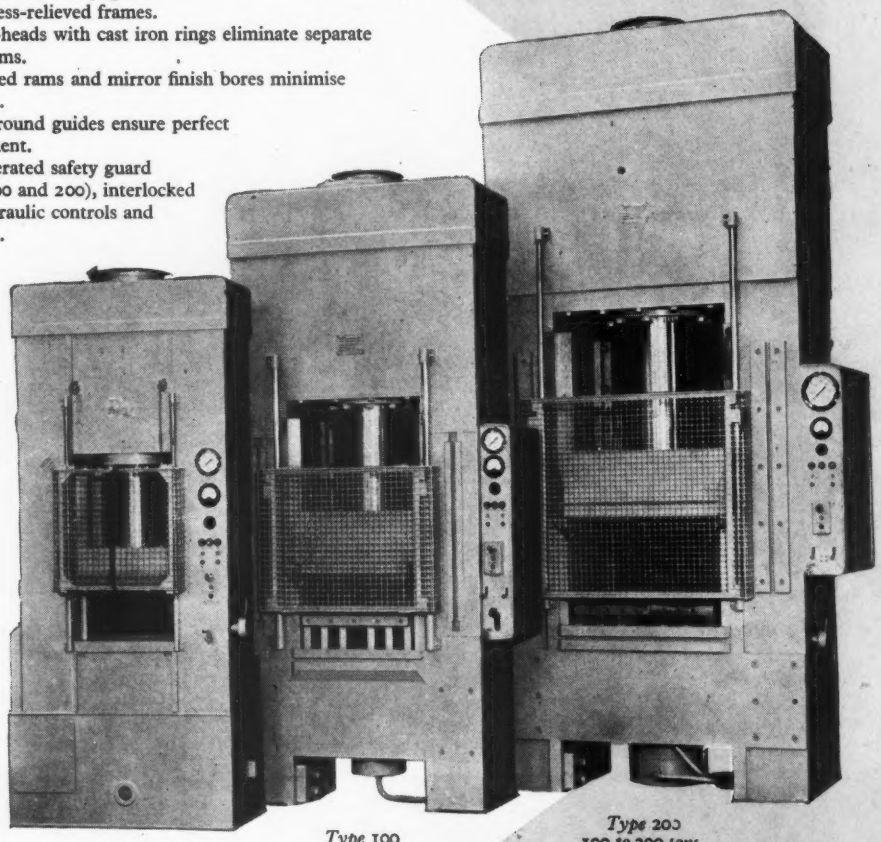
★ Precision ground guides ensure perfect tool alignment.
★ Power operated safety guard (Types 100 and 200), interlocked with hydraulic controls and scotches.



Type 40
20 *to* 60 *tons*

Type 100
50 *to* 150 *tons*

Type 200
100 *to* 300 *tons*

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modern in conception—
proved in practice

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1lb of aluminium can cover 25,000 square feet of surface

A little metal goes a *very* long way with the assistance of B.A.R. Vacuum Coating Equipment.

To put it more vividly, a mere 2 ounces of aluminium would more than cover a tennis court, a 3½-inch cube could coat the near-100,000 square feet of Festival Britain's Dome of Discovery. And such coatings could be effectively stained to represent gold, bronze or other metallic finishes.

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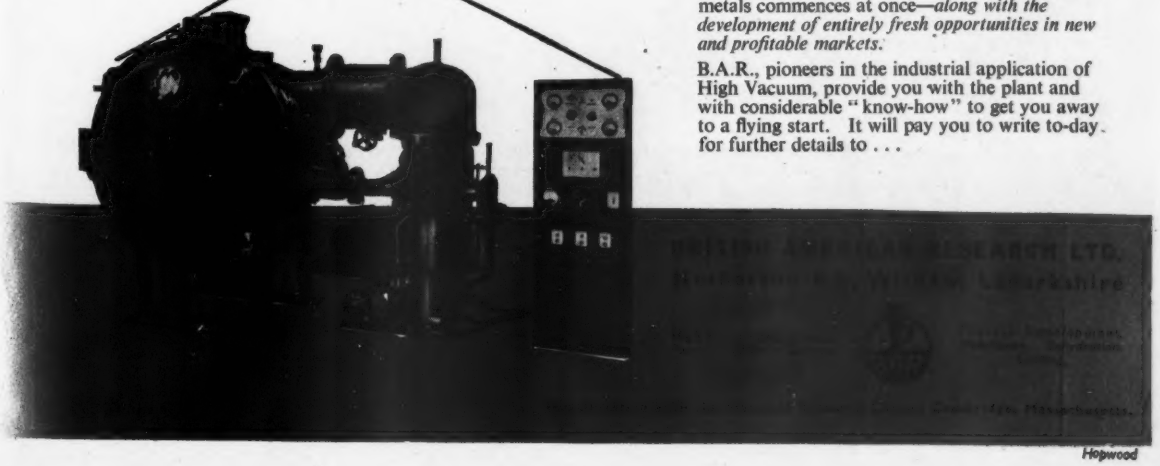
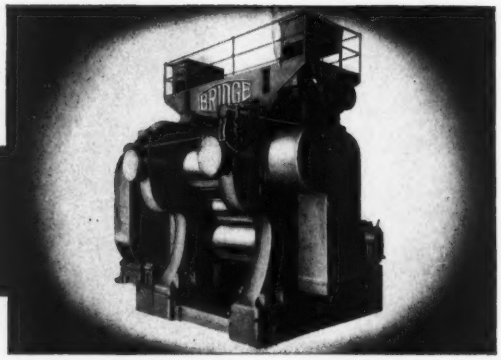
B.A.R., pioneers in the industrial application of High Vacuum, provide you with the plant and with considerable "know-how" to get you away to a flying start. It will pay you to write to-day for further details to . . .



Hopwood

Precision Calender with three superimposed and one offset roller. Flood lubrication.



The Hallmark

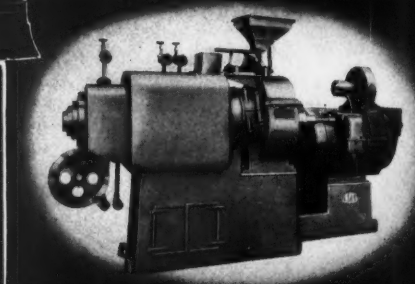
of DESIGN, SERVICE and PERFORMANCE *in* **RUBBER AND PLASTICS MACHINERY**

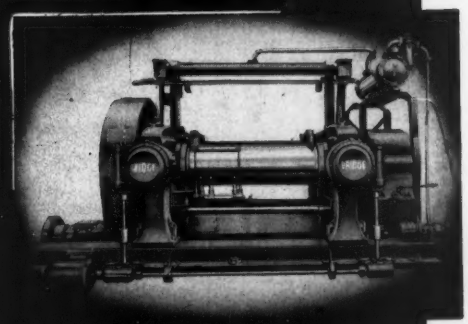
The Bridge — Banbury Patent Mixer. (1)

Precision Calender with four superimposed rollers. Flood lubrication. (2)

4½" Cold Feed Plastics Extruder. (3)

High temperature 22" x 60" Plastics Mill with flood lubrication. (4)





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PLASTIC MOULDERS, FABRICATORS & TOOLMAKERS SINCE 1899

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VP 26b

We're following in baby's footsteps . . . .

There's nothing like getting a fellow plastic-minded when he's young. In the course of the past few years, we've formed and moulded babies' rattles, teething rings and other similar articles, all for the very juvenile enthusiast. Our latest venture in this line is making plastic eyelets for toddlers' shoes. Injection moulded in polystyrene, they may now be seen taking regular constitutionals throughout the highways and byways of Britain.

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Telephone: St. Helens 3206

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The Ferguson Tradition

The example set by Fergus O'Nestor in compelling King John to sign Magna Charta in 1216 *was followed by his son James Fergus O'Nestor in* 1242 *when Henry III was on the throne.*

People had complained to James Fergus about the inability to get direct contact with the King and his Barons, owing to the many underlings in between; so, James Fergus persuaded the King to set up a Business Government whereby vassals could contact the "high-ups" direct. Shortly after, the first English Parliament was formed.

Thus, Jamie Fergus became famous in the moulding of history, just as his successors have won renown in the history of moulding.

DIRECT CONTACT

The principle of direct, prompt and personal contact—established by our ancestor in 1242—is an outstanding feature of the firm of Ferguson to-day, so that those frustrating delays that make GOOD men use BAD language are eliminated by intelligent Receptionists and Telephone Operators who put you speedily in direct contact with the particular Head of the Department you require.

Moreover—there is the PERSONAL note throughout, for we are human folk who believe that the spirit of friendship is the very soul of business . . . and, *don't* our customers relish this prompt and personal attention? Ask them!

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JAMES FERGUSON & SONS LTD.

LEA PARK WORKS, PRINCE GEORGE'S RD., MERTON ABBEY, LONDON S.W.19.

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JOSE DELCLOS, Angel Baixeras, 39, Barcelona, (2), Spain.
EINAR HOLMARK 19, Gl. Kongevej, Copenhagen V, Denmark.

D

This is the Lustrex building in the new Monsanto works at Newport, Mon. It is a special purpose plant based on Monsanto's long experience as producers of polystyrene and designed for bulk production of this important material.

The plant came into operation, as scheduled, in September, 1950. Thus, for the first time British-made polystyrene was available in bulk in a wide range of colours.

Lustrex maintains the high quality associated with all Monsanto products and availability will improve when raw material resources are developed, but this must needs take time. This will enable British designers to further their ideas in exploiting this versatile plastic.

Lustrex *the registered trade name for Monsanto's*

POLYSTYRENE MOULDING CRYSTALS

* MO

CHEMICALS FOR
EVERY INDUSTRY
throughout the world

MONSANTO
CHEMICALS for PLASTICS

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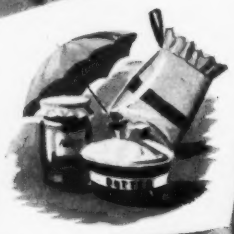
New Vinyl Sheeting of PROVED *Strength*

The domestic uses of 'Craymac', the newest matt-finish vinyl sheeting, are too many to enumerate here. But it can be said for certain that 'Craymac' has that added strength–the 'plus' point which the maker-up is looking for. Send for samples and prove this fact for yourself.

'Craymac' is functional as it is versatile, its durability recommends it for an infinite number of purposes.



Craymac

EXTRA | STRONG

VINYL SHEETING

'Craymac' is ideally suited for kitchen and bathroom use—no amount of moisture can affect it.

For curtains there is a 'Craymac' shade or print to suit every decorating scheme.

Write today for particulars, prices and samples.

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invite enquiries for

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suitable for the manufacture of

MOULDING POWDERS

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Varnish media · Synthetic Resins & Glues
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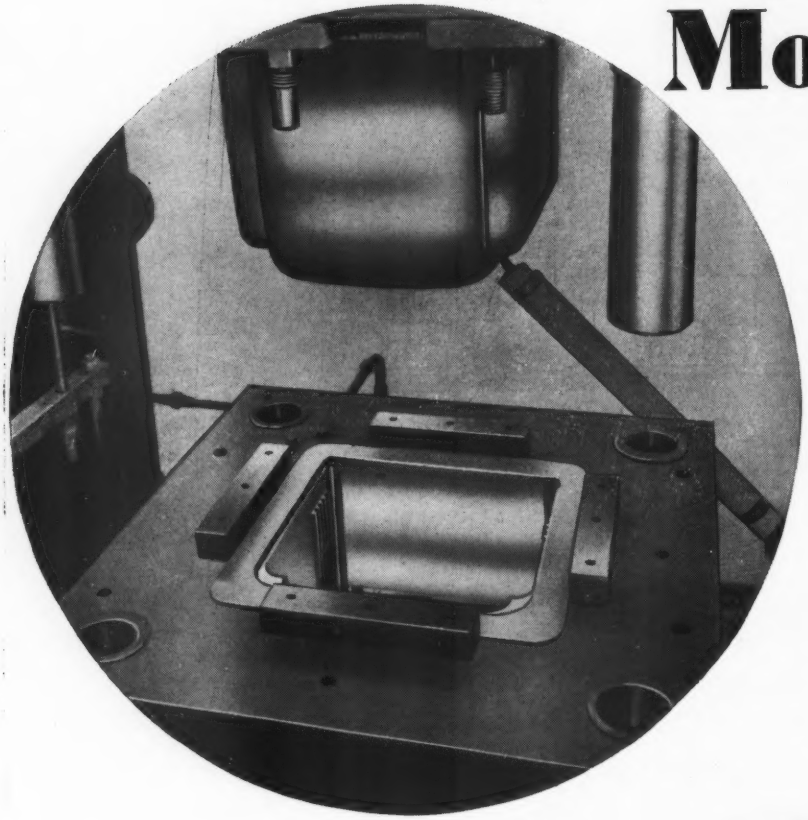
B1

B

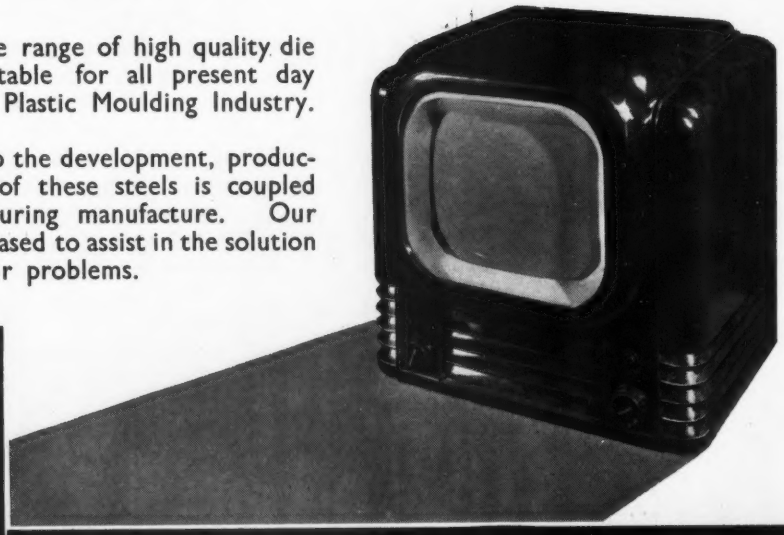
DIE STEELS *for* Plastic Moulding



The photographs show the mould and a Bush Television cabinet manufactured by British Moulded Plastics, Ltd. The Dies are made from PLMB/1 Steel manufactured by English Steel Corporation Ltd.

E.S.C. produce a wide range of high quality die steels, eminently suitable for all present day requirements of the Plastic Moulding Industry.

Constant research into the development, production and application of these steels is coupled with rigid control during manufacture. Our technicians will be pleased to assist in the solution of your problems.



ESC

ENGLISH STEEL CORPORATION LTD

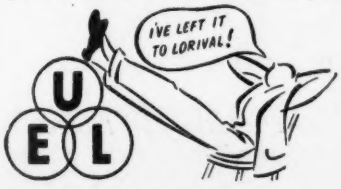
OPENSHAW MANCHESTER

He used to do it the hard way,

....now he leaves it to Lorival

L.17

Lorival ebonite and plastic mouldings are inspected continuously from beginning to end of the manufacturing process. This close check on production ensures a steady stream of uniform mouldings, every one of which will click into place and last at least as long as the product of which it forms a part.



LORIVAL PLASTICS

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POLYVINYL CHLORIDE?

OR

"PERSPEX"?

Any old polystyrene, P.V.C., "perspex" scrap and offcuts?

We're particularly interested in buying these, and

all other kinds of thermoplastic scrap and surplus material,

and we give the best possible prices.

Let us know the kinds and quantities you have for disposal.

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Sole agents in Great Britain, France and Spain for H. Muehlstein & Co. Inc., New York.

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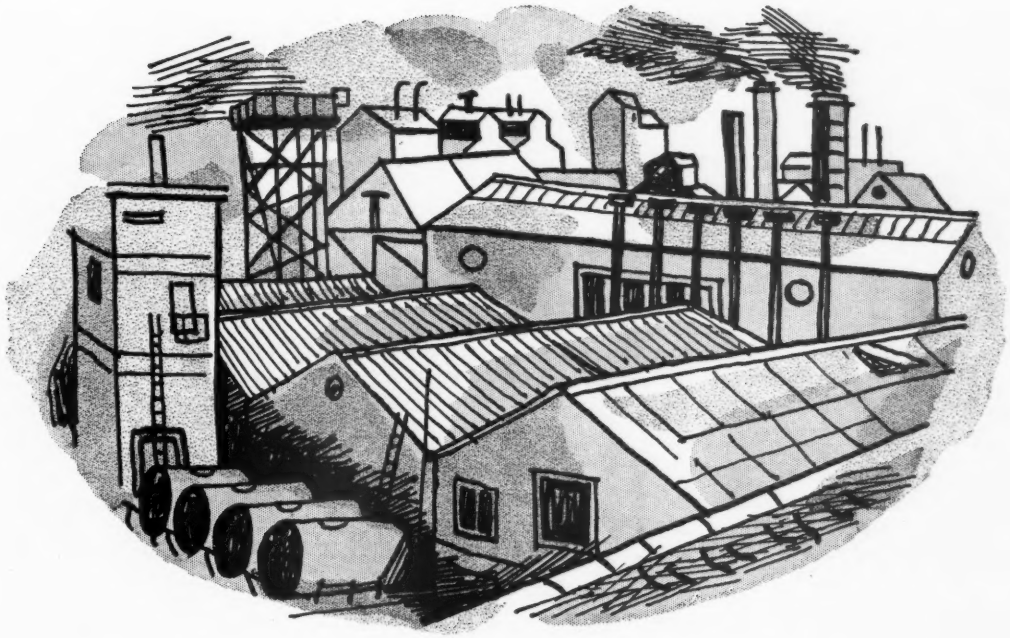
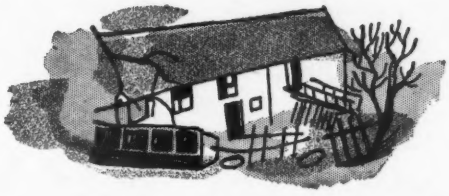
Tel: ROYal 7654 (6 lines) *'Grams: Mulbright, London*



Progress through the Years

Fifty years ago we were making Micanite sheets at Stansted, Essex, in a small building and using some adjoining Tudor cottages for offices. We are still making Micanite sheets but on a vaster scale and in the course of the years we have added to our manufacturing activities Empire varnished insulating materials, Paxolin laminates, Panilax laminates and Panilax moulded resin and the production of High Voltage Bushings and Insulators. In addition to the main works at Walthamstow we have four other factories. Electrical Insulation Engineering is our job and on our Fiftieth Birthday we look back with pride on our achievements through the years.



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m and i *The Micanite and Insulators Co. Ltd.*

Empire Works, Blackhorse Lane, Walthamstow, London, E.17.

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To-day many industries are switching over to plastics, because they have discovered that their products can be produced Better, Quicker and Cheaper by this process. Rising production costs, or material shortages make it necessary for some manufacturers to consider their methods of production. If YOU are faced with this problem and would like to investigate the possibilities of plastics in relation to YOUR product, consult our technical experts, they will give you sound advice on this matter. R. H. Windsor Limited are known throughout the world for injection moulding and extrusion machines, dies, moulds and ancillary equipment.

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With BAKELITE material the moulder knows, from long practical experience, that the performance of any given grade is consistent. Thus, in the moulder's shop, are seen the practical results of all the research and development, the efficient production and quality control techniques, and the painstaking tests that collectively ensure the reliability of BAKELITE Moulding Materials.

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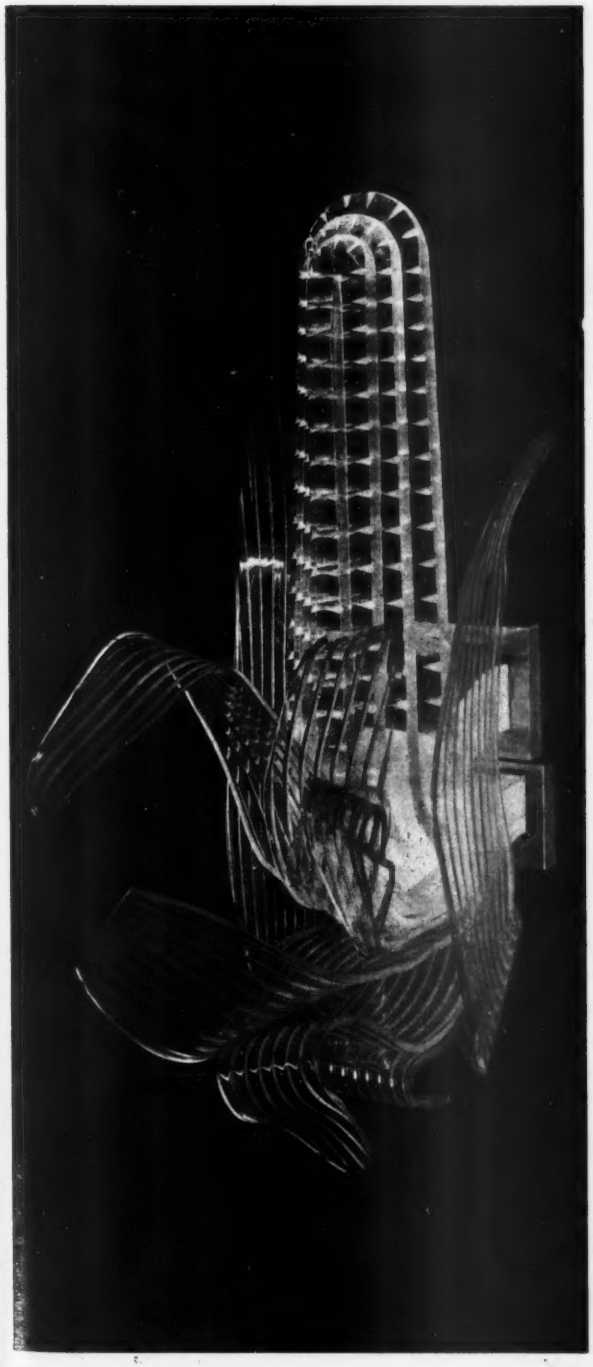
P35

Plastics

DEALING WITH THE MANUFACTURE, USES AND POTENTIALITIES OF PLASTIC MATERIALS

PROPRIETORS: TEMPLE PRESS LIMITED

CHAIRMAN and MANAGING DIRECTOR: ROLAND E. DANGERFIELD



EDITOR: M. D. CURWEN, B.Sc., A.R.I.C.

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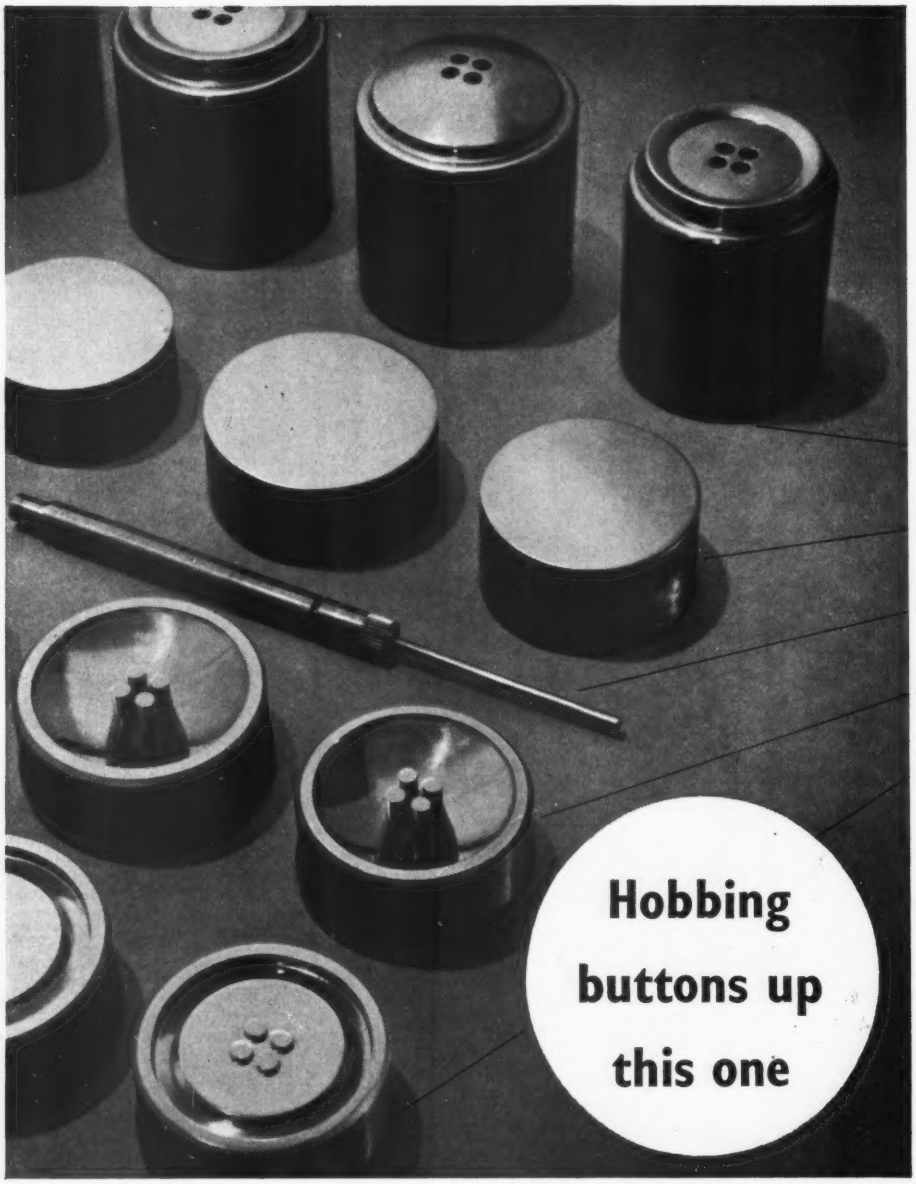
Symbolic figure of a corn cob for Reception Room of the Brown and Polson Group, Wellington House, London. Fabricated in "Perspex" to design by Mario M. Arnengol, and exhibited at the recent British Plastics Exhibition.



For reproducing the simple rounded form of button dies, hobbing not only provides the most economical process, but is the only satisfactory means of forming the coring pins in one piece with the main die parts. We are equipped with hobbing presses of up to 2000 tons capacity, which make short work of hobbings, large or small. Better still, we are widely experienced in hob-making and button mould manufacture. We illustrate some of our button hobs, the blanks and finished dies; over three hundred punch and die parts may be required for a large multi-impression mould for making small buttons.

B·I·P TOOLS LIMITED

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B·I·P GROUP

Telephone: Birmingham East 2061. Telegrams: Plasmould, Birmingham 24

Plastics

VOL. XVI. No. 168 JULY, 1951

"What heroes shall I sound in anthems high but those who bats to England supply.
For in their use the cricketer is bless'd, hammered they never are, but all compressed.
Their assortment all London doth excel, of handsome wood they are, and seasoned well."

Announcement concerning J. Bartlett & Co., Patent Compressed Cricket Bat Manufacturers, 20, Vine Street, Waterloo Road, London, in "The Londoniad: Giving a Full Description of the Principal Establishments, together with the Most Honourable and Substantial Men, in the Capital of England." By James Torrington Spencer Lidstone, London, 1856.

EDITORIALS

The British Plastics Exhibition

THE first completely plastics exhibition to be held was a most exhilarating one and for it we must congratulate the sponsors, "British Plastics," and the British Plastics Federation. By no means least, we must congratulate the individual standholders of the industry, who rose to the occasion and completely eclipsed all previous shows with a splendid effort.

It was remarkable for many things. It had been made quite clear to everybody that, because of exceptional shortage of all raw materials, there would be few, if any, concrete results so far as getting new business was concerned. We cannot get much more than one pint out of a pint pot. It had also been repeated, year after year and after every B.I.F., that the industry, especially the moulding and fabrication section of it, could not afford the expense of costly stands. Yet little more than one month after the British Industries Fair the plastics industry rises completely above itself and seems to deny it ever thought or said such things. It has expressed itself in no uncertain terms as a cohesive industry well able to stand on its own feet.

More manufacturing companies took part in it than ever before, some of them old-established concerns that had never before exhibited anywhere. Each and every stand was designed and erected in a manner that was a credit to themselves and to the industry. It was clear that, unlike on previous B.I.F. occasions, designers had been allowed a much freer hand, for there was a vast improvement in layout and none was cluttered up with repetitive components. In other words, at long last we could see the wood for the trees, and a clearer picture of the plastics industry. Quality, on the whole, was exceptionally high.

Another feature of the exhibition was its comprehensiveness, and in the record composition of the show of about 100 constituent companies with nearly 90 stands (the difference refers to subsidiary companies) we saw the picture not only clearer but embracing more than ever before. It was good to get confirmation of this from Mr. Charles Waghorne, of Insulators, Ltd., and to hear his considered opinion that the whole exhibition in this respect, and in its freedom from "bittiness," surpassed the last New York plastics exhibition he had seen.

The comprehensiveness was noted in several sections. Most apparent among them was the inclusion of many of the important plastics-machinery makers in the country, whereas during the B.I.F. they prefer generally to segregate themselves from Earls Court and gather together in Castle Bromwich. And a splendid show they made of it with laboratory and small equipment, compression, injection and extrusion machines of small and large sizes. Ancillary equipment, such as general heating and sealing machines and two examples of apparatus for depositing metal on plastics by vacuum distillation, were on view

Among the moulders' and fabricators' stands and in those general feature exhibits erected under the ægis of the British Plastics Federation and the Council of Industrial Design, a wider field of applications was shown than ever before, and in an improved form. The results obtained from the above-mentioned vacuum metal-deposition machines were seen on the stand of a famous Birmingham company in the form of three-dimensional plastics as motorcar insignias, name plates, etc. Dinghies of resin-bonded glass fibre, a magnificent range of carvings in "acrylics" and laminates, complete ship-cabins, railway compartments and offices wall-surfaced and table-topped with laminates, added a picture of real strength to an industry that, on the whole, provides a huge number of invisible components to such a large number of other industries that the public mind can scarcely absorb their significance.

Perhaps most important of all results was the general unequivocal enthusiasm of all participants. There was a new note of pride which spells nothing but good for the future. If this is a test of the value of segregating from the B.I.F., let us segregate. The industry can at last stand on its own feet.

Criticism

THERE is not much to criticize. As for the concrete business results that the industry has been demanding for so long from exhibitions, but which no one expected at all in this, valuable inquiries were claimed by many. Several exhibitors told us that in one day they had discussed more problems with inquirers than during the whole period of the B.I.F. Not that much could be done about them, it is true, because of shortages, but it all created a tremendous amount of confidence for the future, when raw materials will flow again in adequate measure.

The general shape of the exhibition was somewhat "muzzy," and it was obvious that a clear plan regarding the treatment, vis-à-vis the public, had not been devised. What plan there was, was a half-hearted affair, and it was apparent that some did not want the public and some did. As a result, the public did not come in any important numbers. It is

true that some stands were designed to attract "the man in the street" and the special features, including "Plastics—Design and Use," had a similar purpose, but the treatment was by no means simple enough. Something more than photographs of complicated plant and so-called simple drawings (which, in fact, are never simple) is necessary; they must have been rather unintelligible to the completely non-technical. What was worse, this "educational" section was hidden in the gallery.

If it is accepted that the public should be admitted and that it is to the benefit of the plastics industry, it should be given something to bite its teeth on. Such a section should be situated immediately on entering the doors, and should be the preamble to everything that follows. It was clear that nothing had been learned from the "Daily Graphic" plastics exhibition at Dorland Hall, which had many excellent points. It was also sad to note that no advantage was taken of the opportunity to teach the public something of plastics by a means similar to an "informative labelling" programme or by a "fitness-for-purpose" programme.

Even if the public is not admitted in any future exhibition, we believe that some such preamble should be included for those industrialists, engineers, students, etc., who have no specific knowledge of our industry.

Plastics Convention

The Convention held in the National Hall, Olympia, on each of the days of the Exhibition, July 6-16, was a complete success, each of the sessions being attended by large audiences, conspicuous amongst them being many overseas contingents. The papers were exceptionally well chosen and the authors all of high repute in their special branches; the subjects ranged from the chemical and physical aspects of the raw materials and plastics production, to discussions on the most recent technical advances in applications in industry: in textiles and textile manufacture, in building, in the chemical industry, in transport, in surgery, in packaging, in ship-building, etc. All the papers will be printed in book form for general distribution.

There was also a "Housewives' Quiz." A report on it is awaited with bated breath.

MOULDING POWDER AND SHOT

Windsor Story

The round of entertainment in honour of foreign visitors and friends during the run of the British Plastics Exhibition blazed to a climax on Wednesday night, June 13, when R. H. Windsor, Ltd., gave a gala dinner at Grosvenor House. The chairman, Mr. F. Wright and Mrs Wright, the managing director, Mr. R. E. G. Windsor and Mrs. Windsor, and Mrs. A. E. Windsor, received the hundreds of guests which included visitors from N. and S. America, the European countries, India and Pakistan. It was a very magnificent affair with some fine speeches and an especially cheering and amusing one by "Our Bert," Mr. Herbert Bridge, of British Moulded Plastics, Ltd. As I looked round the milling crowd my mind went back to a March day in 1939 and a long train journey home from the Leipzig Fair, where I had gone to see the section on "Spritzgusse," as the Germans so quaintly call the injection process. This return journey I spent with Mr. R. H. Windsor, the founder of the firm, who died so young in 1947, and with our cheerful friend Mr. Norris, his companion. Mr. Windsor talked of injection machines and their future, prognosticated sizes which made my hair stand on end and made me wonder where the jobs for such big machines were coming from. The 3-oz. machine (euphemistically catalogued as 125 grams) was in production, but he foresaw the 8- and 10-oz. size, and a tremendous increase in the use of acetate and polystyrene. I wonder what he would have thought of the 48-oz. machine that his company showed last month on its stand, of the exports that it is doing to-day and of the world-wide journeyings of the present youthful managing director, his son.

* * *

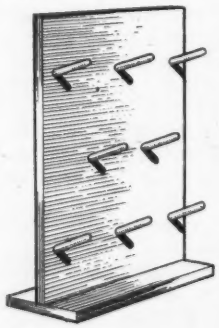
Marks of Quality

How much more keener on "hall-marks of quality" are other nations than we! At least, they are keener on using collaborative effort. During the exhibition period we had long discussions on this subject with Mrs. J. Okholm-Hansen, editress of the Danish Plastics journal "Plastic" and with Bill Steanes and Len Herman of the Australian Plastics Institute. The Danish industry has introduced a system which we hope to discuss at a later date, whereby moulded and other units (household goods are the main concern) are tested for "suitability for purpose" by a committee and are permitted a "P" mark. It is a system quite without any link in itself with any chemical and physical standards for the raw material or moulding, the presumption being that "suitability for purpose" is all that is necessary. Mr. Steanes and Mr. Herman tell me that the Australian industry is working on the same general principle and that it is hoped to induce all the important moulders to join the scheme. Nothing like this exists here, our certification mark being based on raw material and moulding specifications. Manufacturers in this country appear generally to prefer the age-old method of relying on trade-marks on units which they themselves have proved to their own satisfaction and testing, as possessing "suitability for purpose." Theoretically the two methods are not so fundamentally different, nor, if the manufacturer is of high repute and instructs the buyer regarding the units he buys, are they in practice. On the other hand the "committee control" method with close collaboration with big buyers, seems to be of greater potential value to the plastics industry as a whole. Here, criticism of this method appears to be based on the question "Quis custodiet ipsos custodes?"

* * *

Plastics in the Lab.

An American company has been interested enough in my suggestion of simple laboratory equipment in plastics, e.g., burette and filter stands (see "Plastics," April, 1951, p. 86), to ask if they may broadcast this information in the U.S.A. I should be delighted if they would. A firm in this country writes to ask what a laboratory draining board looks like (I did not reproduce a picture of it). Here it is, given below. It is really a vertical board with pegs fitted in it at a convenient angle (say 20 degrees) so that washed beakers and flasks may be stuck on the pegs and allowed to drain. The board is fixed vertically on an ordinary draining board on the edge of a sink and can be made of any water-resisting rigid material, e.g., laminate or hard p.v.c. sheet. The pegs should be of extruded polythene or p.v.c. rod that is soft enough not to break the thin glass but rigid enough not to sag under the weight of a ¼-lb. to ½-lb. glass beaker. A hard p.v.c. rod with a soft end is now possible and would do admirably. Acid or alkali resistance scarcely enters into the problem as the beakers have already been washed in water.



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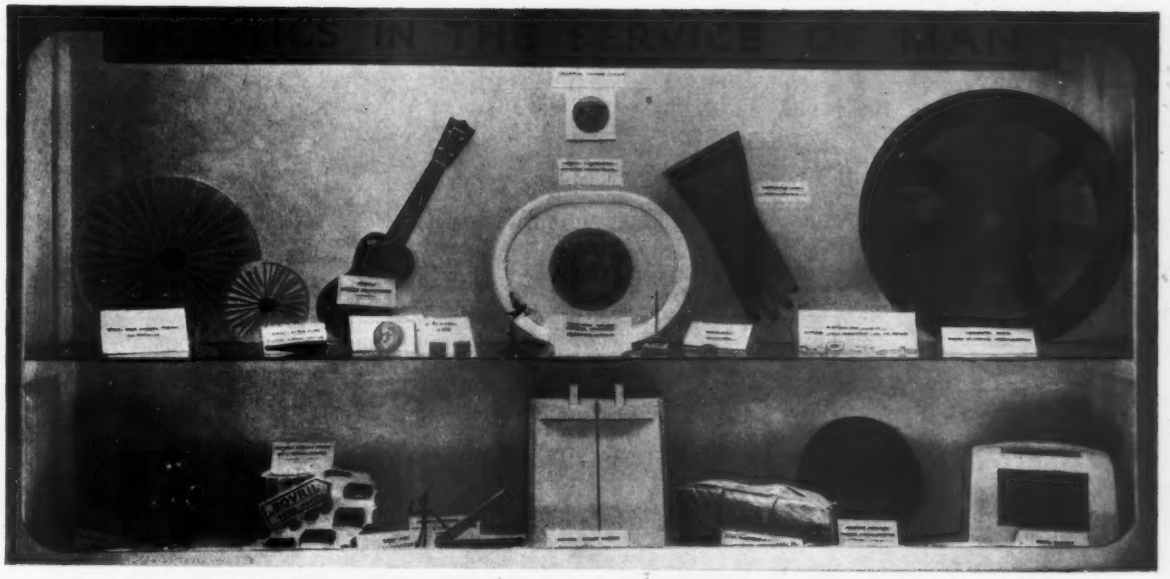


Productions of the British plastics industry, seen on the stand of Temple Press Ltd., proprietors and publishers of "Plastics."

The British Plastics Exhibition

THIS has been the first trade exhibition in this country solely devoted to the British plastics industry and, as already stated in our editorial, it has proved to be, in our opinion, immensely superior in quantity and quality to any of the special Plastics Sections of the British Industries Fairs held in the past.

In general shape it conformed to much more than a straightforward trade show, for it included, in addition to the stands of manufacturers of raw materials, of machines, of moulders and fabricators, a good picture of the rudiments of the different processes involved and some general feature exhibits which portrayed production, use and design. Finally, there was the completely successful Convention to knit the structure into a cohesive whole.

In the following pages we have departed from the usual practice of showing photographs of stands in which manufactured units lose their identity, and have concentrated on outstanding or typical examples of production.

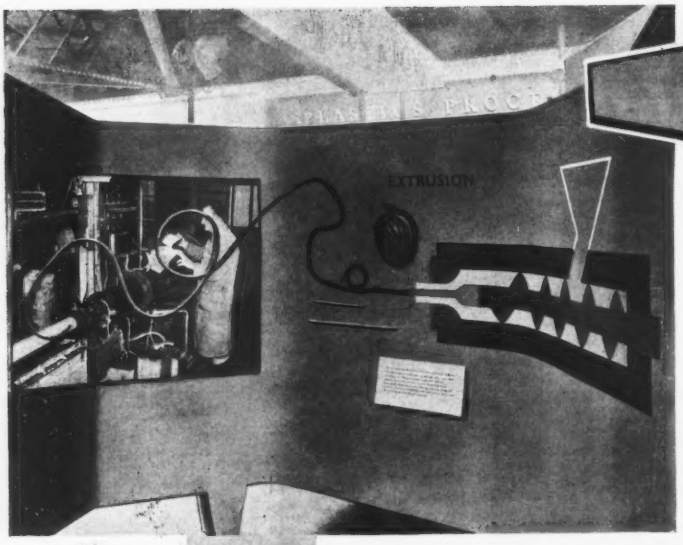
The series of photographs is shown in what we think to be a proper sequence, giving first an insight to the educational principle worked out by the British Plastics Federation and the Council of Industrial Design. This was done in pictorial form, so far as factory processes are concerned, and by actual finished units, so far as uses in industry and the home are concerned. Furthermore, this section included large constructional pieces, such as dinghies, complete offices, ships' cabins, and so on. The bulk of the series of photographs that follows consists of selected productions from individual stands of raw - material producers, machine makers, moulders and fabricators.

Gutta-percha mouldings from the Great Exhibition of 1851, some of which are still in production today. (Telegraph Construction and Maintenance Co. Ltd.)

There were some 95 stands in all, a most encouraging advance on all previous fairs and exhibitions, and we welcome the appearance of "new" stands, especially those who, while among the earliest of the moulders (e.g., Barrett and Elers, who first began moulding "rubber" stoppers in 1872; Litholite Insulators; Telegraph Construction and Maintenance, etc.), have not exhibited before, at least recently, in a comprehensive plastics exhibit. We welcome, too, Ranton and Co.; Creators; Wilmot Breeden; D. G. Todd and Co.: Insulation Equipments; G.E.C.; Lankro Chemicals; Geigy: Runcolite; Kleemann; Barclay Stuart Plastics; Plasticads and Clivestone Plastics; Airothene, etc., to the plastics exhibition field.

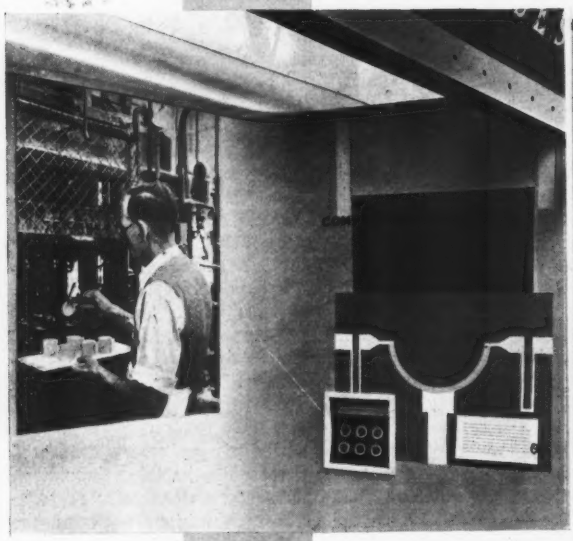
A noteworthy feature was the widely embracing nature of the exhibits. Thus were seen not only the latest incursions into television and refrigeration, but also examples of techniques never before seen at an exhibition, such as the application of soft p.v.c. components produced by the dipping process for mechanical engineering units, and a model showing the continuous production of building board from resin-bonded wood waste. Two moulders devoted their exhibits to nylon mouldings.

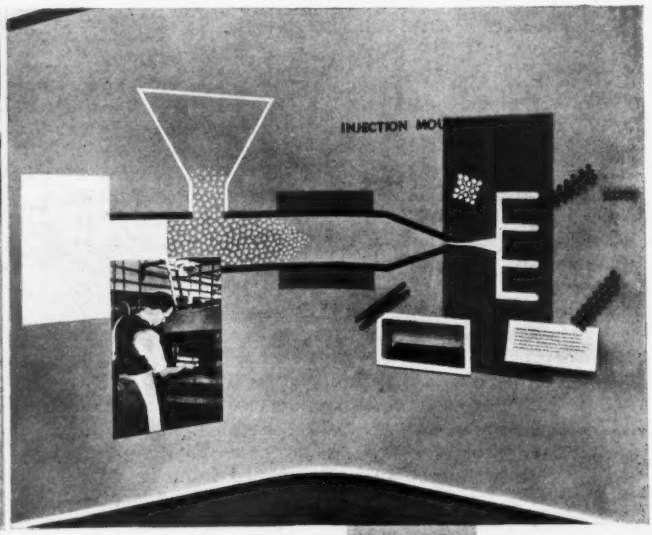
We have referred above to the vastly improved stands from the layout point of view, and we think that the designers have generally been given a freer hand. What is even more noteworthy, however, is the greatly improved qualities of the mouldings and fabrications. One could almost sense an increase in the existence of factory - made specifications, which means careful choice of material, good design and good moulding. This was, perhaps, the most encouraging aspect of the show.

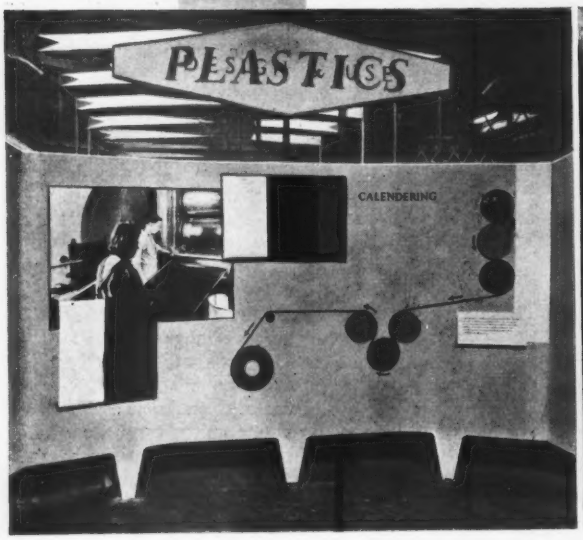


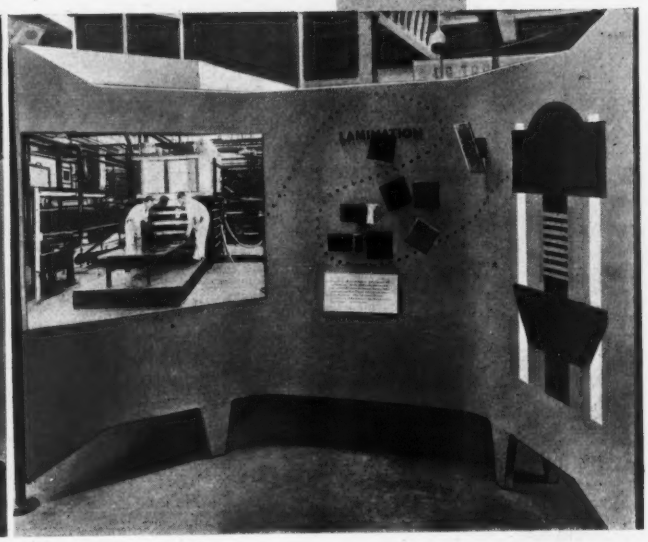
PLASTICS

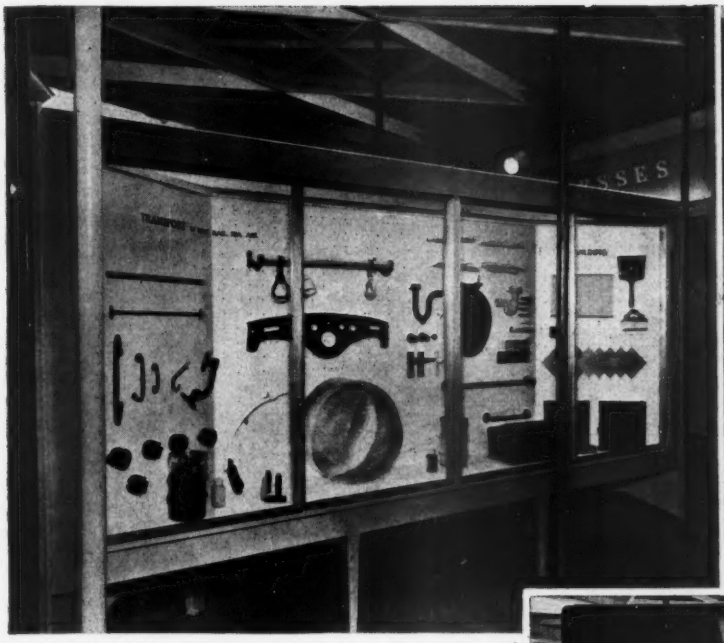
THIS feature of the Exhibition, organized jointly by the Council of Industrial Design and the British Plastics Federation, presented an educational picture of the various aspects of the plastics industry. It showed how plastics are made, and their special and distinctive properties which enable them to serve the modern community in its industrial and everyday life. Processing methods by which the raw materials of the industry are converted into semi-finished or finished products were described, particular reference being made to the technique of injection moulding, compression moulding, extrusion, calendering and lamination. Examples of materials and productions were provided by courtesy of British manufacturers. In the selection of the finished goods which were shown, emphasis was laid on good design. The importance of selecting the

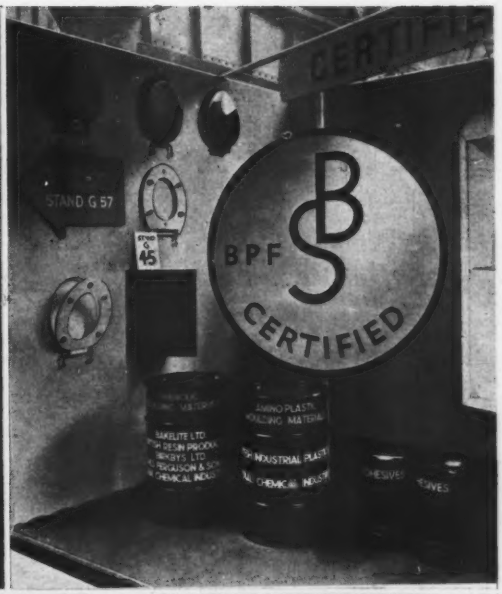






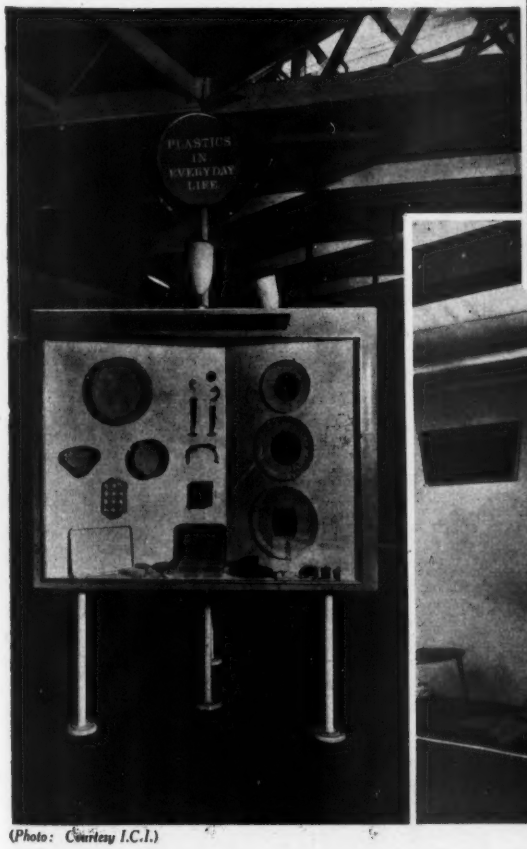






(*Photo: Courtesy I.C.I.*)

right material and the need for choosing the most suitable fabricating methods were also stressed. Another stand organized by the British Plastics Federation, demonstrating the value of their certification mark for materials and mouldings, is also illustrated on this page.



(*Photo: Courtesy I.C.I.*)

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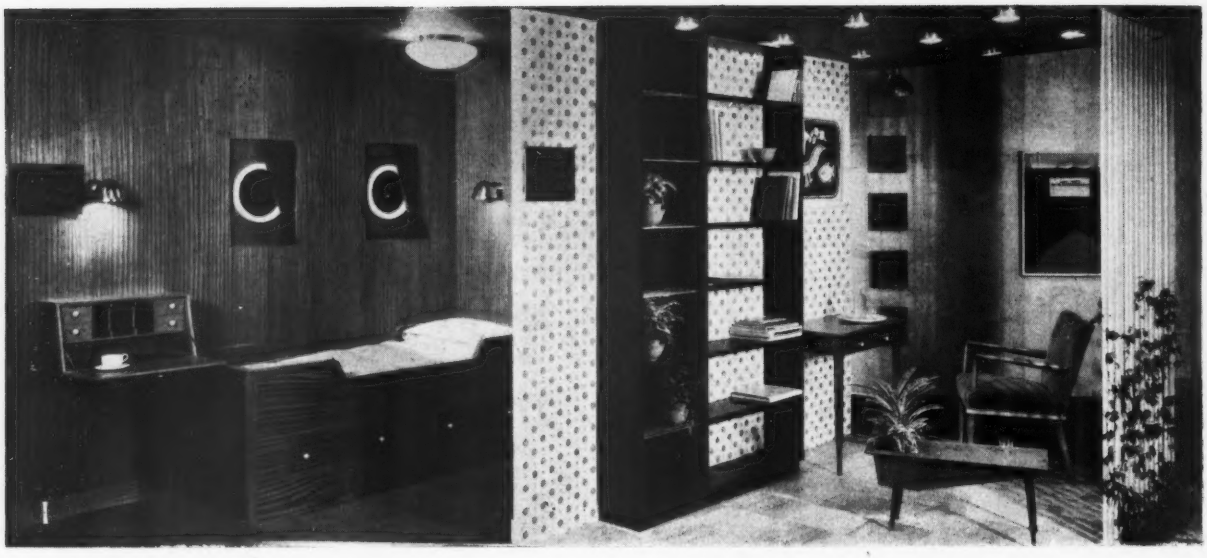
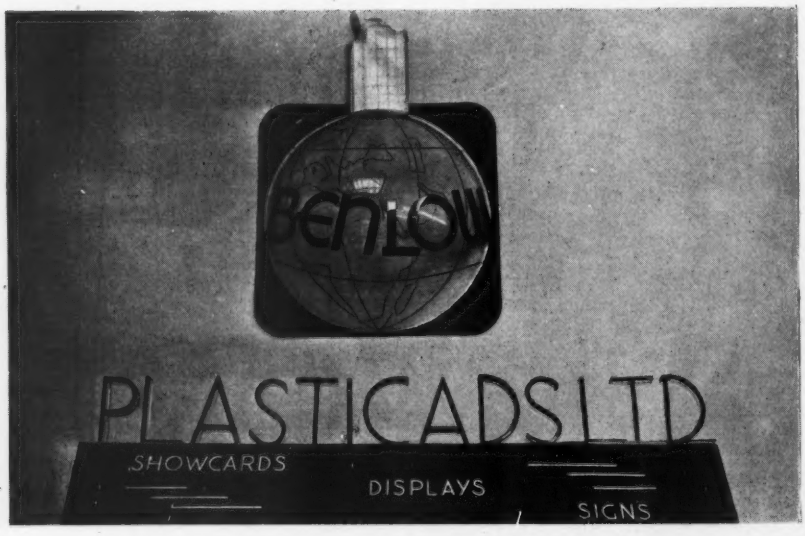


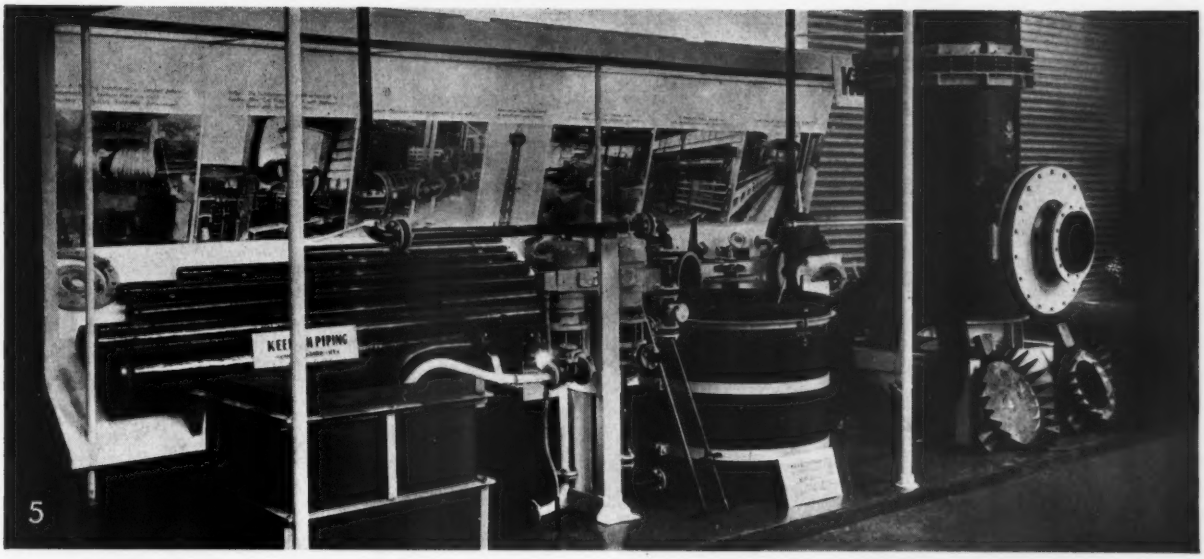
1. "Celloboard" resin-bonded chip-board, soon to be manufactured in continuous length by a process developed by Vere Engineering Co., Ltd., has been used in the construction of walls, floors and furniture of the ship's cabin and living room seen on this stand.

2. This metering device fabricated by Rediweld, Ltd., for highly corrosive acids including hydrofluoric acid, shows the application of polythene and rigid p.v.c. in the chemical industry.

3. "Plasoco" plastics-coated material made by loco, Ltd., replaces the "oilskin" type for industrial and nautical uses. The garments shown are in use by life-boat crews and fishing crews.

4. Many processes including shaping, cutting, engraving and silk-screen printing were used by Plasticads, Ltd., to produce this "Perspex" display sign for Benlow cigarette lighters and the sign below it.



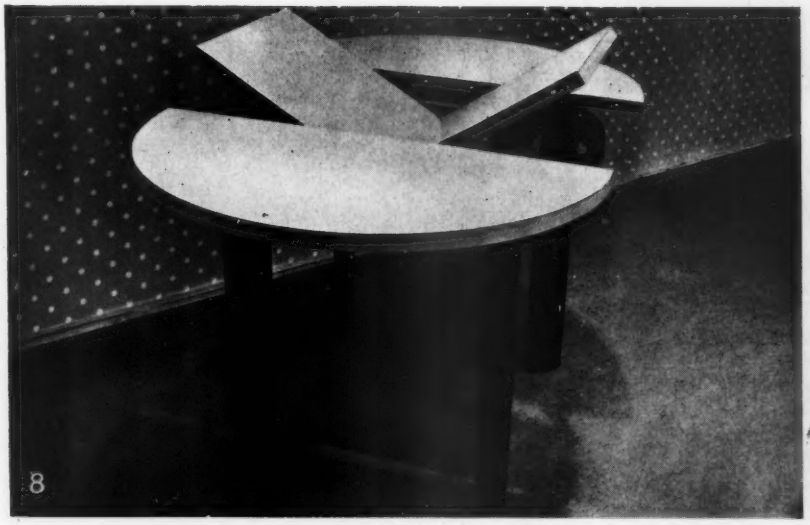


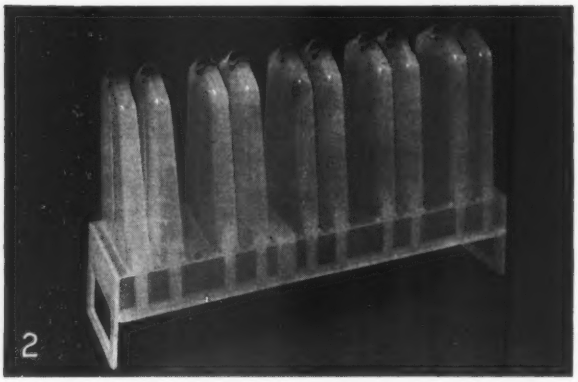
5. In addition to "Keebush" cast phenolic components the Kestner Evaporator and Engineering Co., Ltd., are now also using p.v.c. and polythene in the construction of chemical plant.

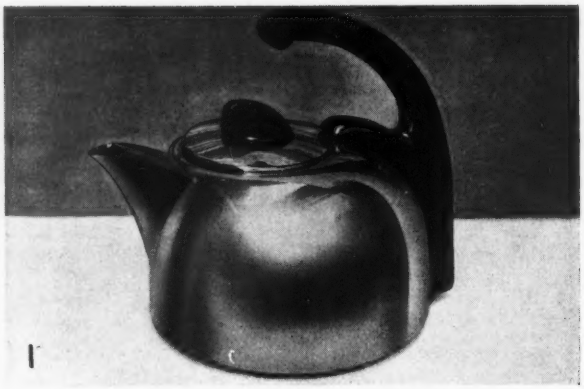
6. "Plastahide" unsupported p.v.c. sheeting made by Plastahide (Coverings) Ltd., is used to upholster the seat and back-rest of this tubular steel stacking chair.

7. "Formica" bar counters and facings, and extruded p.v.c. beer piping are two of the exhibits showing everyday uses of plastics products made by Thomas De La Rue and Co., Ltd.

8. "Warerite" laminate is used extensively in the manufacture of this table and other pieces of furniture in a new range exhibited by Insulation Equipments, Ltd.







1. Handle for the "Creda" electric kettle, moulded by United Ebonite and Lorival, Ltd., in black phenolic plastics.

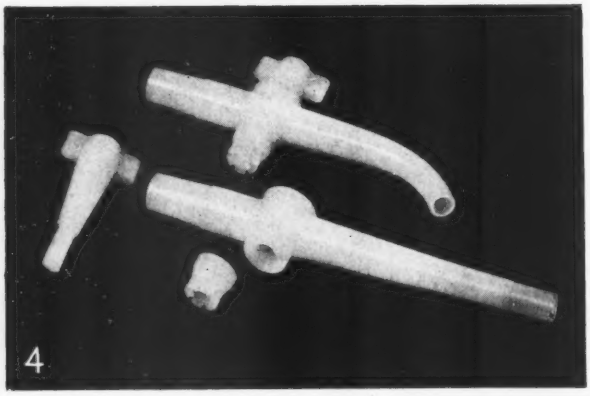
2. Hygienic and non-toxic former for "ice lollies," moulded in polythene by J. F. Kenure, Ltd., for the Aero Pipe and Glass Co., Ltd.

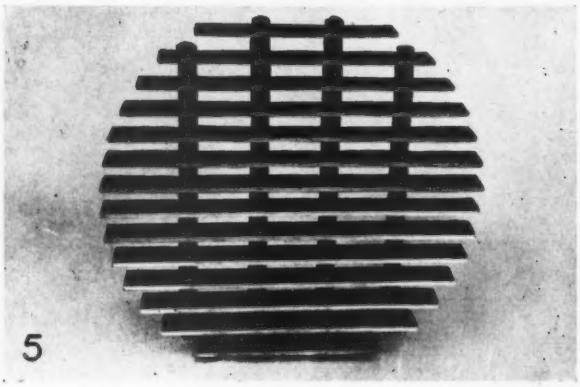
3. Two vacuum flask housings for Thermos (1925) Ltd., moulded in phenolic materials by the Witton Moulded Insulation Works of General Electric Co., Ltd.

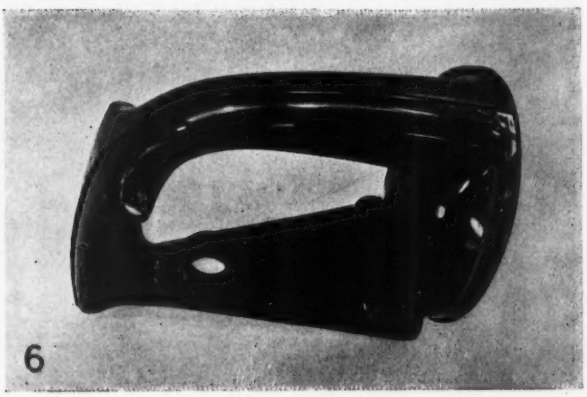
4. Taps, made by Airothene Ltd., consisting entirely of three injection-moulded polythene components and having wide uses in chemical and similar work.

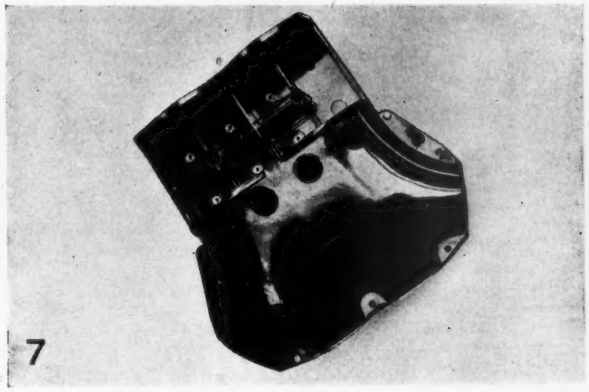
5. The chemical resistance of "Ferobestos" phenolic impregnated asbestos materials manufactured by Ferodo, Ltd., make them suitable for fabrications such as this grid for British Filters, Ltd.

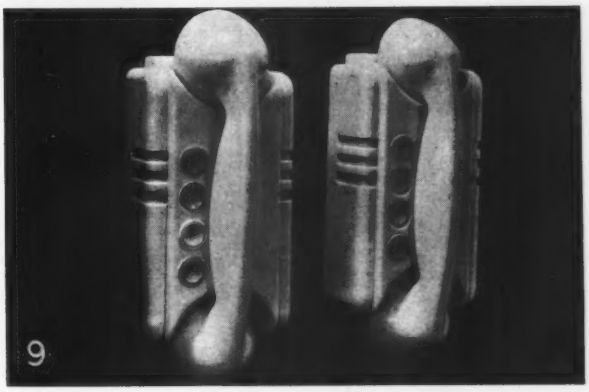
6. Handle, moulded in phenolic material by Insulators, Ltd., used in a paraffin-heated domestic iron manufactured by the Tilley Lamp Co., Ltd.











7. Junction box moulded by Birkbys, Ltd., in black phenolic plastics, for W. Lucy and Co., Ltd.

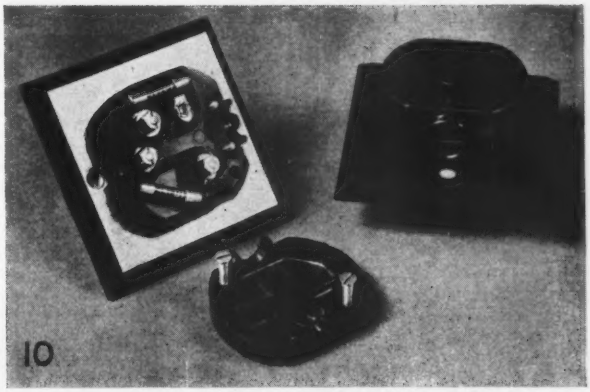
8. Hacksaw frame handle, moulded by Ashdowns, Ltd., in blue cellulose acetate, for James Neil and Co., Ltd.

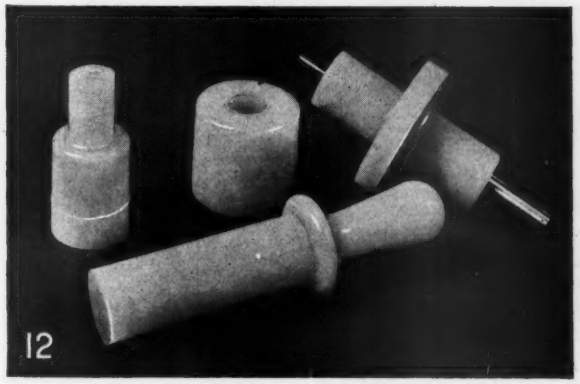
9. Office intercommunications telephone and handset moulded in urea plastics by Kent Mouldings, Ltd.

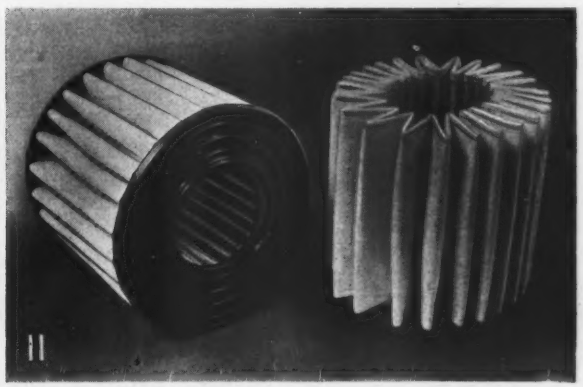
10. Thirteen-amp three-pin plug and socket, with fuses incorporated in the plug, moulded in phenolic material by W.R.C. Ltd. to conform to B.S.S. 1363.

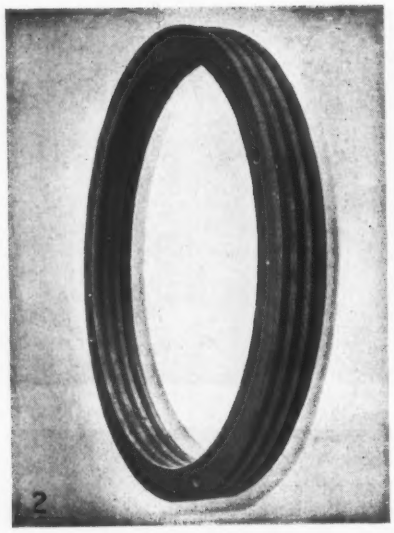
11. Side discs for these oil filters are manufactured by Creators, Ltd., in flexible black p.v.c.

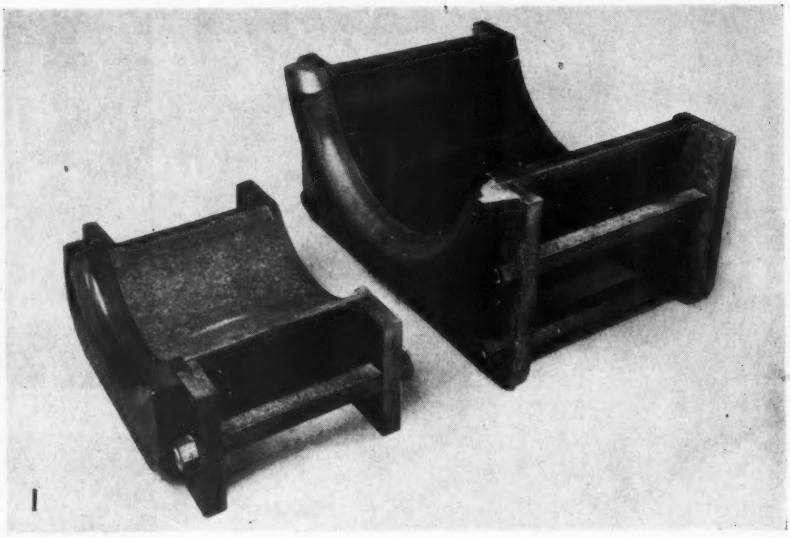
12. Insulators and other components, including (front) a forcing ram for a food processing machine, moulded in "Telcothene" (polythene) by Telegraph Construction and Maintenance Co., Ltd.











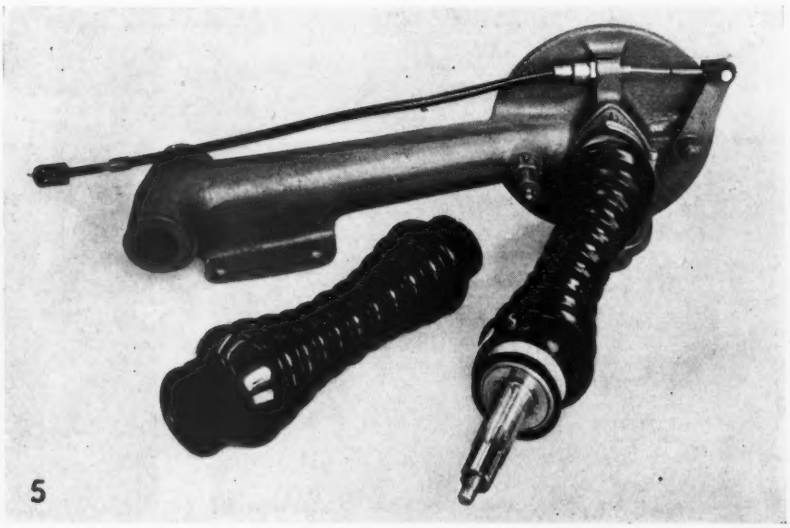
1. Water-lubricated roller bearings manufactured from "Ferobestos" phenolic resin impregnated asbestos materials by Ferodo, Ltd.

2. Transformer end ring machined by Ashdowns, Ltd., from a grade of "Ashlam" consisting of alternate plys of paper-base and fabric-base phenolic bonded laminates, thus giving the electrical properties of the one combined with the strength of the latter.

3. Prototype drum for transporting chemicals, and like products, is fabricated by Thermo-Plastics, Ltd., using black reinforced cellulose acetate.

4. Curved arm-rests for a dental chair by Amalgamated Dental Engineering Industries, Ltd., moulded in phenolic material by Litholite Insulators and St. Albans Mouldings, Ltd.

5. Flexible gaiter made in p.v.c. by Creators, Ltd., used to cover two ball joints on the rear-wheel assembly of the invalid carriage manufactured by A.C. Cars, Ltd. The whole gaiter is filled with grease to give constant lubrication.



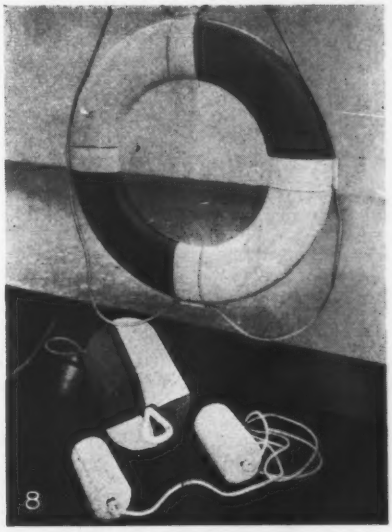
6. Technical mouldings for the electrical industry manufactured by Barrett and Elers, Ltd., include a transformer base and meter case components.

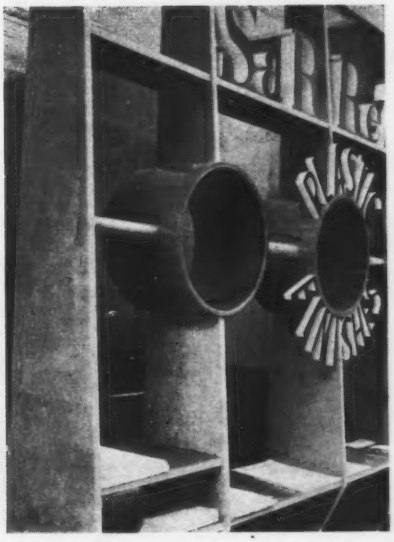
7. Components for a new type of washing machine shortly to be produced by Carefree Domestic Appliances, Ltd., are moulded by Halex, Ltd., Industrial Division, in water-resistant, shock-resistant phenolic plastics. The swirling, rotating motion of the water given by the electrically operated propeller when the machine is placed in a sink provides washing conditions.

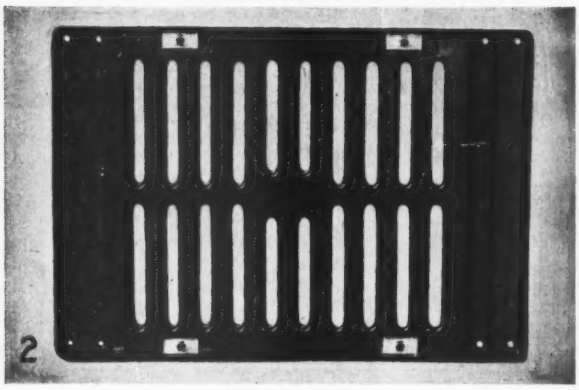
8. Life-belts and other marine components are typical applications of expanded rubber and plastics materials manufactured by Expanded Rubber Co., Ltd.

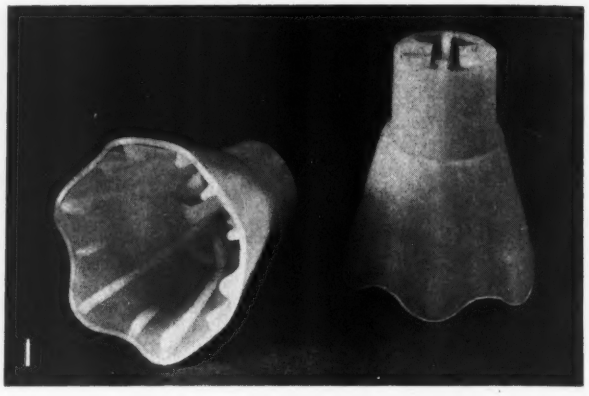
9. Plywood, block-board, chip-board or any veneered surface can be protected by the "Sar-Rez" process giving a hard urea resin finish. The stand of the manufacturers, Saro Laminated Wood Products, Ltd., was constructed with "Sar-Rez" products.

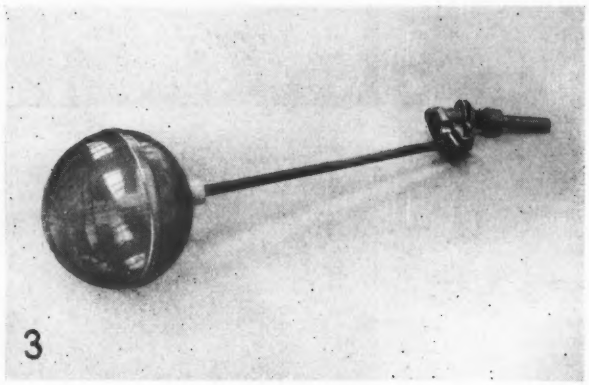
10. Phenolics, urea, polystyrene and cellulose acetate are used for the housing, grille, push-buttons and knob of this intercommunications unit moulded by Insulators, Ltd., for Edison Swan Electric Co., Ltd.

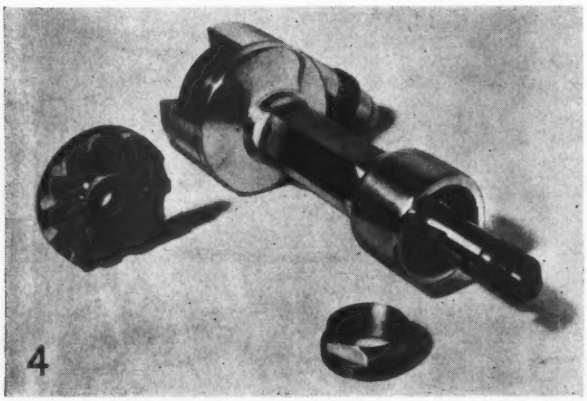


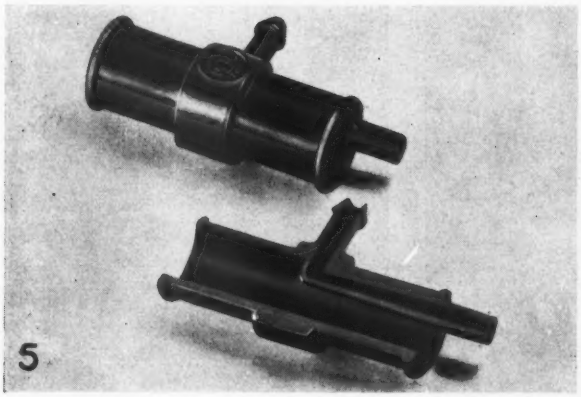


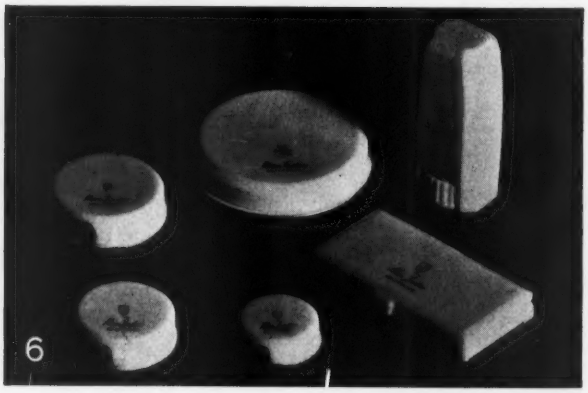












1. Collets for a bottle washing machine, injection - moulded in polythene, by J. F. Kenure, Ltd.

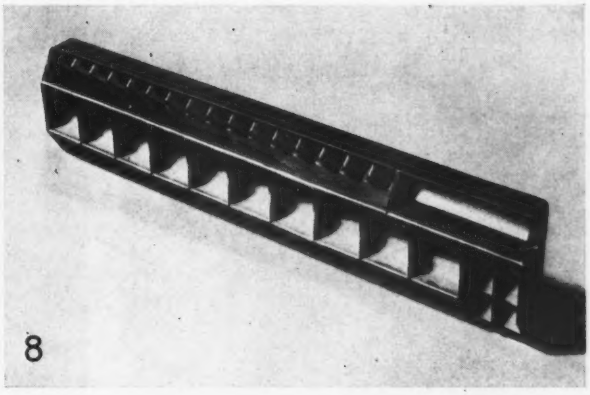
2. The SFW type "Spire" speed fixes made by Simmonds Aerocessories, Ltd., not only fix the grille of this ventilator made by Evered and Co., Ltd., but also act as runners for the moving part.

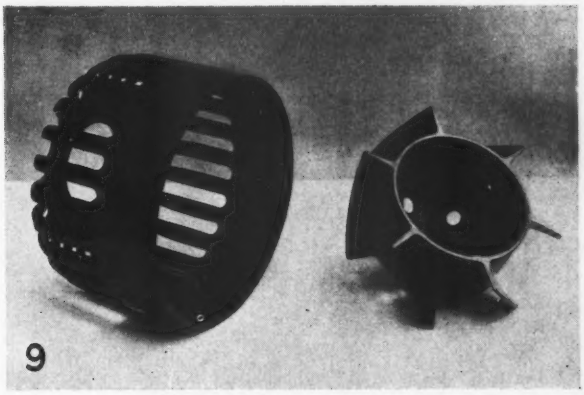
3. Ball-float for water cisterns moulded by E. K. Cole, Ltd., Plastics Division, in clear, transparent polystyrene.

4. "Ajax" air turbine hand grinder with rotor housing cut away to show the rotor made of "Tufnol" phenolic-bonded laminate and cover removed to show one of the "Tufnol" ball race cages. A sectioned rotor shows the intricate machining.

5. Air inlet tube in black phenolic materials moulded by Litholite Insulators and St. Albans Mouldings, Ltd., for hospital equipment made by the British Oxygen Co., Ltd.

6. A variety of cosmetics containers for Max Factor, injection moulded in white polystyrene by Plastic Engineers, Ltd.





7. "Stylojet" marine air vent, together with the phenolic compounds, moulded by E. K. Cole, Ltd., Plastics Division, which are used in its production.

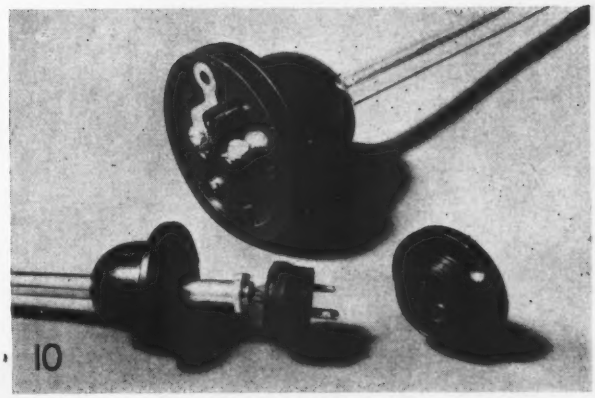
8. Plotter's tray for radar equipment, moulded in phenolic plastics by Barrett and Elers, Ltd.

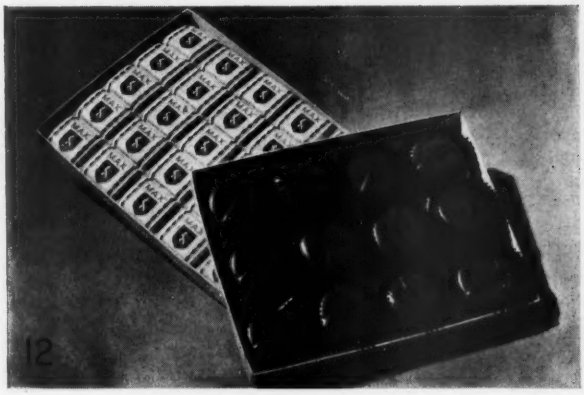
9. Air impeller and housing of the ventilator for a film projector, moulded in phenolic materials by British Moulded Plastics, Ltd.

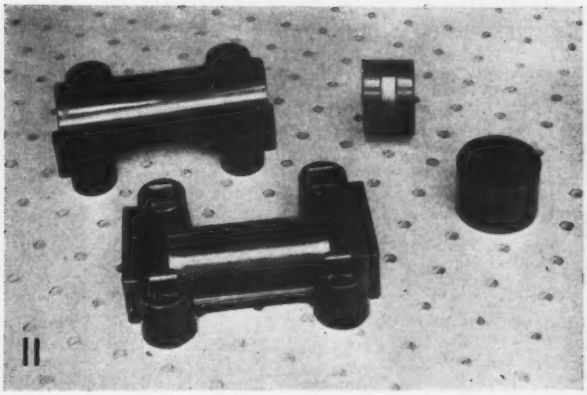
10. The ceiling electric light fitting moulded by Ranton and Co., Ltd., may be completely disconnected for cleaning purposes, as shown in the foreground.

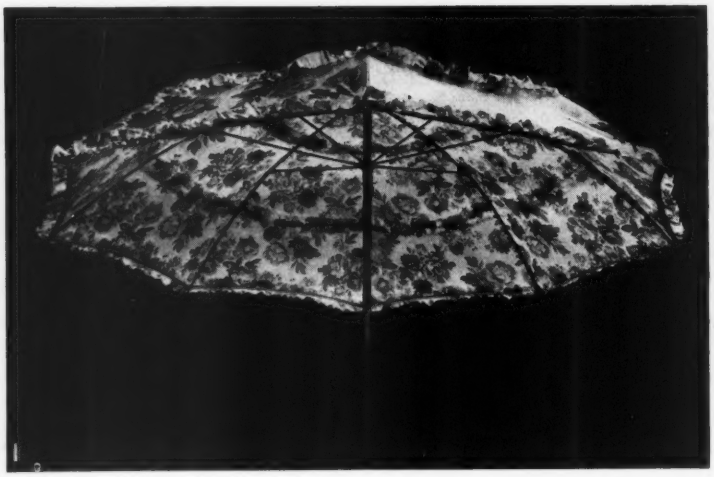
11. Self-lubricating bearings and guides for a combine harvester made by International Harvester Co. of Great Britain, Ltd., are moulded by Ashdowns, Ltd., from graphite-loaded "Bakelite" material.

12. Dummy confectionery for display purposes are made from "Celastoid" sheeting (British Celanese, Ltd.) by Hunt Partners, Ltd.









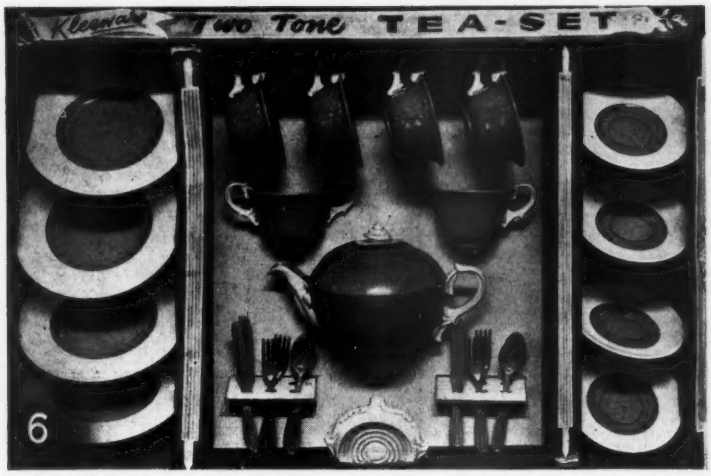
1. This parasol, made from printed p.v.c. sheeting, although not in production, was shown by Storeys of Lancaster as a potential application of this material.

2. "Etronic" radio cabinet in urea plastics, moulded by Streetly Manufacturing Co., Ltd., for Hale Electric Co., Ltd.

3. Shoe-filler for display purposes, blown from "Celastoid" tubing made by British Celanese, Ltd.

4. The red imitation reptile skin used to make this bag, is one of the range of high quality plastics reproduction of animal skins manufactured by Embossing and Spraying, Ltd.

5. Cocktail shaker, glasses and sweet dish, moulded by Runcolite, Ltd., in transparent tinted acrylic plastics and decorated with the Festival symbol in gold.



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6. Blue and white injection mouldings are cemented together to form the pieces of this two-colour toy tea-set manufactured by O. and M. Kleemank, Ltd.

7. Pulleys as well as curtain runners, injection moulded in nylon by Plastic Engineers, Ltd., are used on the "Rufflette" curtain rail made by Thomas French and Son, Ltd.

8. The jointed elephant, one of the most recent toys made by Rosedale Associated Manufacturers, Ltd., is here seen with the injection-mould "shot" producing the components.

9. "Li-Lo" playball in many colours, made from polyvinyl chloride by P. B. Cow and Co., Ltd.

10. Lavatory seat in pastel shades of cellulose acetate, injection-moulded by Halex, Ltd., Industrial Division.

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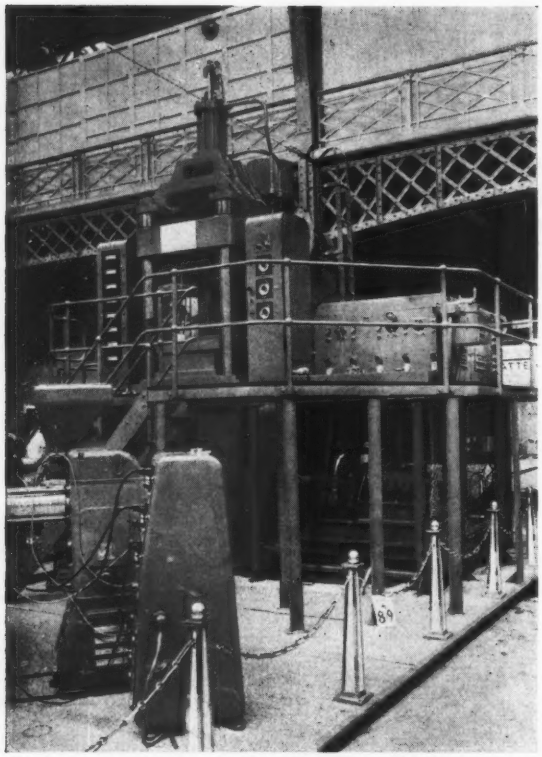
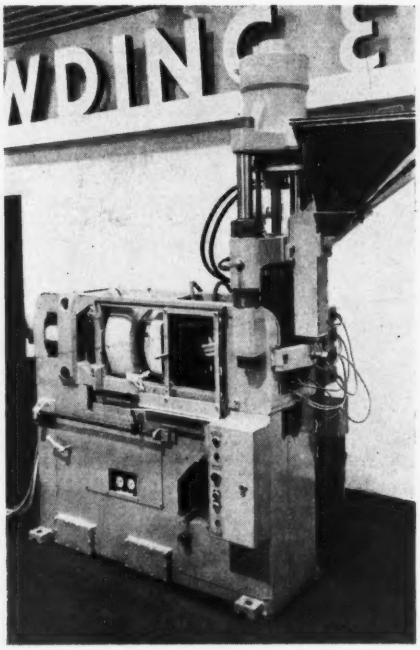
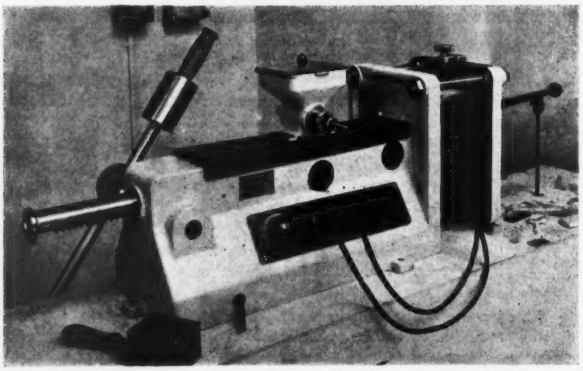
Machinery and other Equipment seen at the British Plastics Exhibition



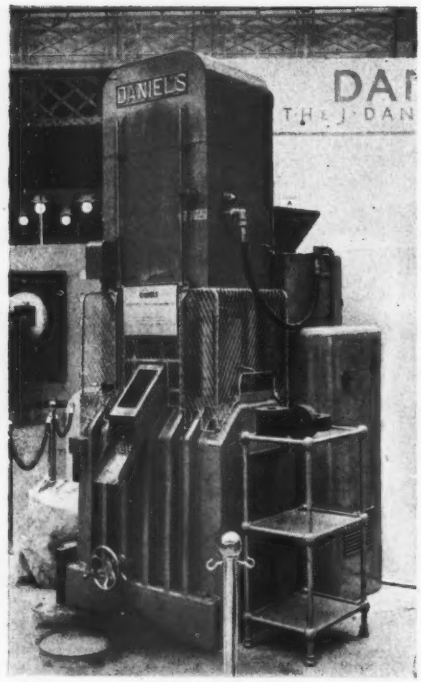
The J.-C. 48-oz. "Universal" hydraulic moulding press, a new production by R. H. Windsor, Ltd., is a complete departure from conventional design. This machine was described in "Plastics," May 1951, page 141.



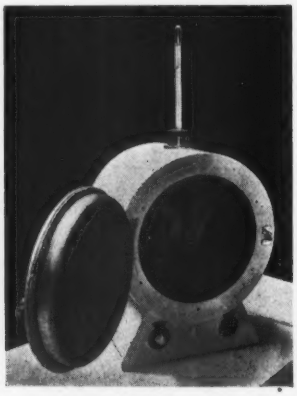
(Right) The new Lester 4-oz. injection machine, exhibited by Dowding and Doll Ltd., incorporates many features which are the result of years of experience. The injection unit can be provided with automatic nozzle cut-off for the moulding of nylon.



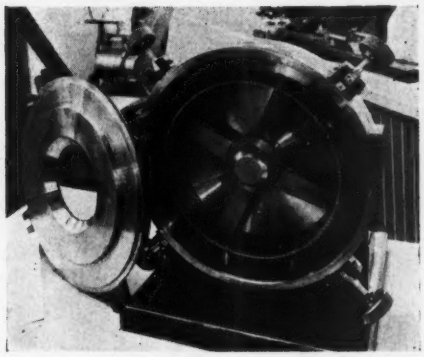
(Above) The "Plasticor" ½-oz. hand-operated injection moulding machine, by Davidson's (Manchester) Ltd., is a remarkably compact unit for unskilled labour.



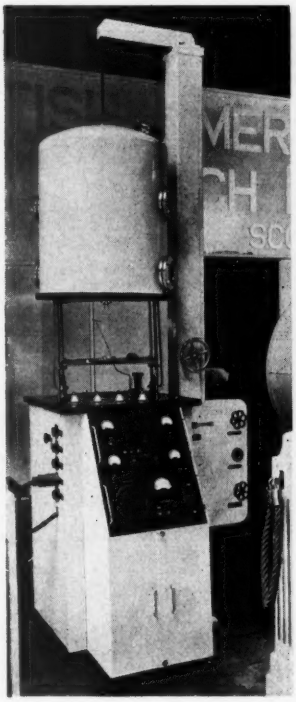
The new Daniels preforming machine, by T. H. and J. Daniels, Ltd., exerts a maximum load of 125 tons on a 6 in. diameter tablet. A modified Daniels process timer makes this machine fully automatic.



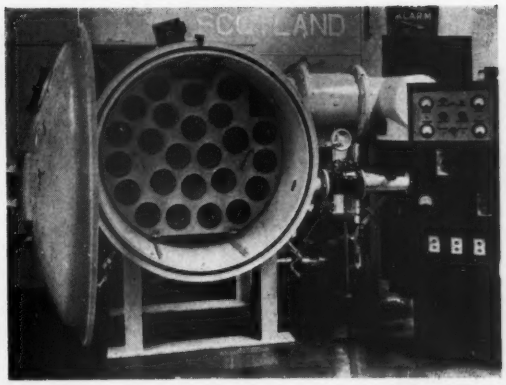
Electrically heated oven for use in coating metal objects with "Telcothene" (polythene) by a novel technique. (Telegraph Construction and Maintenance Co. Ltd.)



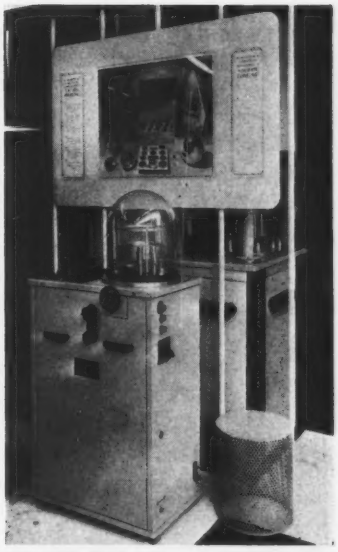
The "Junior" rotary cutter, exhibited by Christy and Norris, Ltd., is driven by a 1 h.p. motor and will cut up 30 to 60 lb. of plastics sprues per hour.



High vacuum coating unit, with 12-in. steel bell-jar as coating chamber, for medium scale production and experimental work (British American Research, Ltd.).

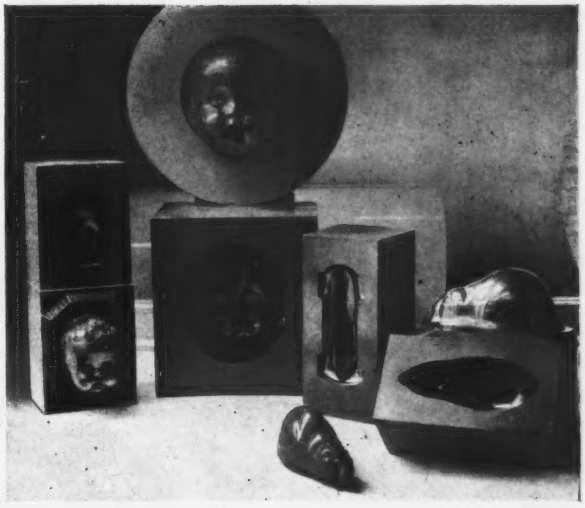


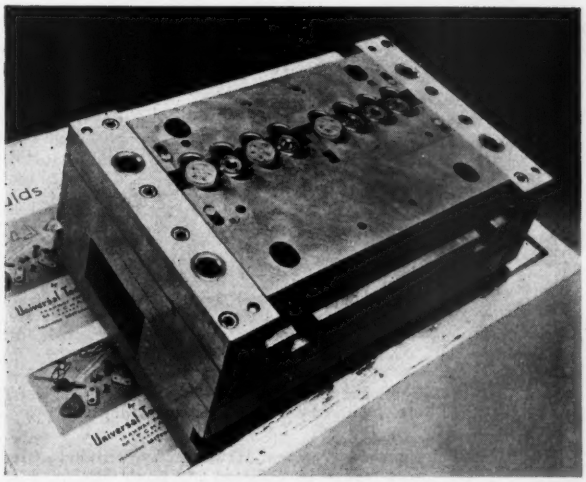
British American Research, Ltd., exhibited their Type 3103 Evaporator for the high vacuum coating of plastics with metal films. The coating chamber has a diameter of 48 ins. The deposition of thin films of metal greatly extends the utilitarian and decorative possibilities of dielectrics such as plastics, and the technique has been brought to the level of quantity production.



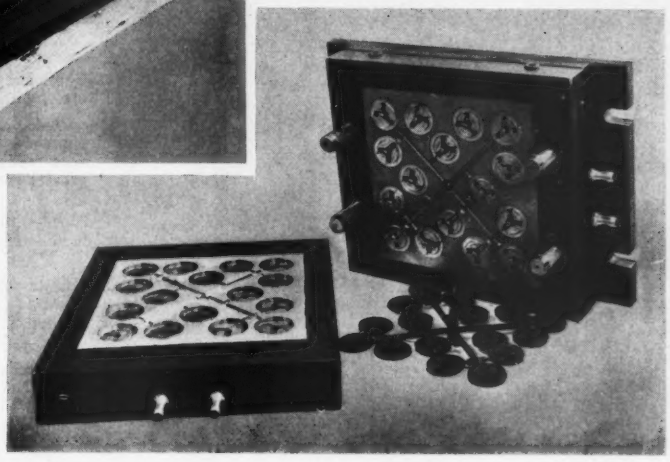
The smallest of the high vacuum coating equipment in the range exhibited by W. Edwards and Co. (London), Ltd. Larger units are available for bulk production.

(Right) Moulds by Projectile and Engineering Co., Ltd. This company have facilities for producing hobbed cavities requiring pressures up to 3,000 tons. They also exhibited part of their range of "Peco" injection machines, now built in capacities from 2 oz. to 16 oz.





(Above) A typical example of tool making by Universal Tools, Ltd. An injection mould for nylon pulleys, moulded by Plastic Engineers, Ltd., for Thomas French and Sons, Ltd., for use on the "Rufflette" curtain rail (see illustration 7 on page 205).



(Left) Tools by Resinoid and Mica Products, Ltd., for the injection moulding of cellulose acetate spacer discs for the timing mechanism made by Chamberlain and Hookham, Ltd., for a washing machine.

Festival

FOLLOWING the selection of Festival souvenirs published in "Plastics" last month, we now present another group of plastics products, either inspired by the Festival or merely decorated for the occasion. The now familiar Festival symbol is featured on most of the products and it is interesting to note that in this small selection

1. "Jopo" sailor by Kinver and Radov, moulded in p.v.c. over a wire frame; it can be twisted into almost any position.

2. Comb and mirror in welded p.v.c. case with Festival crest, made by E. R. Holloway, Ltd.

3. Engraved "Perspex" table mats by Parco Industries, with reverse sand-blasted and partly blackened for greater contrast.

4. Paper-knife in cellulose acetate with Festival crest moulded in relief, made by London Moulders, Ltd.

5. Plastics fabrications form component of all these souvenir desk accessories by Hinkel's Metalstyles of London, Ltd.

6. Guide card for the South Bank Exhibition, manufactured by Malcolm Campbell (Plastics) Ltd., is laminated between two sheets of transparent plastics.

Souvenirs

alone at least six different techniques have been used for applying this motif. These include moulding in relief, foil transfer marking, engraving and filling-in colours, reverse engraving on transparent sheet and finally, colouring of the reverse side of a moulding to give a three-dimensional effect from the front.

7. Engraved and coloured lapel badge on white "Perspex," made by Slape Laboratories, Netherbury, Dorset.

8. Beaker with Festival crest manufactured in polythene by Jarret, Rainsford and Laughton, Ltd.

9. This group of guardsmen is another version of the "Jopo" toy made by Kinver and Radov.

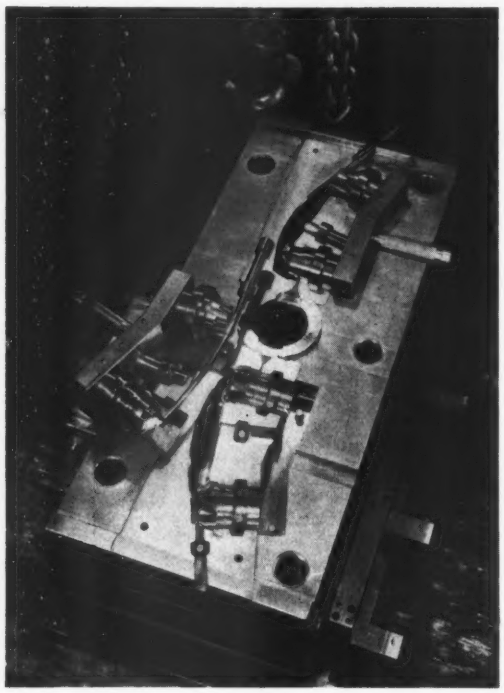
10. One of the series of toy snowstorms with glass bowl and plastic base, made by R. Meissner, of London.

11 By turning two small wheels, views of London are seen in the Logga viewer distributed by Woggle Sales, Ltd.

12 Combined paper-weight and pin-tray made by Wilmot-Breeden, Ltd., using the "three-dimensional" method of decoration.

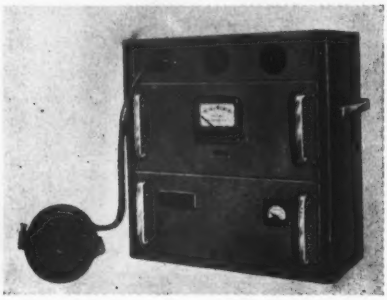
PRODUCTION NEWS

Raw Materials, New Plant, Works Organization, Control Apparatus, Research, Personal and Trade Notes



INDUCTION-HEATED MOULD.—Our photograph shows an induction-heated mould for a telephone hand-set, made by B.I.P. Tools, Ltd., Tyburn Road, Erdington, Birmingham, 24, for export to Holland. It incorporates several novel features, such as the removable coring pins which form the cable passage. We saw this mould at the recent Gauge and Tool Exhibition in London, where there was a very impressive display of moulds by B.I.P. Tools, Ltd., and a section devoted to cold hobbings, examples of turned shapes and other production processes of interest to the plastics industry.

CABLE ECCENTRICITY GAUGE.—One of the greatest problems associated with plastics and insulated cables and wires has been to ensure truly concentric extrusion of the insulating coating with respect to the conductor. The Addison Electric Co., Ltd., 163, Holland Park Avenue, London, W.11, has developed the first commercial, non-destructive gauge for the continuous surveillance of the cable during the extrusion process.



This equipment has been designed for continuous process surveillance in the manufacture of conductors insulated with rubber or synthetic materials, as well as for laboratory and acceptance tests on the final product. It consists of two separate units: a gauge head comprising a coil system housed in a split cast-iron case, through which the cable under test passes, and a control unit incorporating an electronic oscillator which supplies a substantially constant current to the cable under test, and a detector amplifier which gives a direct reading of the eccentricity. The control unit also incorporates a relay for the automatic operation of warning signals should the eccentricity exceed a specified tolerance. One oscillator and control unit may allow the supervision of a number of extruders simultaneously, provided each channel is furnished with its own gauge head. A manually or motor-operated switch unit is employed in this case to transfer the oscillator output and amplifier input terminals, as well as any control lines, cyclicly from one measuring position to the next. Roller devices are available for guiding the cable through the gauge head.

GAUGE AND TOOL MAKERS' ASSOCIATION, Standbrook House, 2-5, Old Bond Street, London, W.1, have sent us a copy of their Export Catalogue, which is now in its second edition. This publication covers the productions of over 60 members of the Association, with their announcements, adequately illustrated and printed in English, French and Spanish. The Association now has a total membership of 216 members.

CERAMIC TIPPED TOOLS.—B.S.A. Tools, Ltd., Birmingham, announce the development of an entirely new type of cutting tool material known as B.S.A.-Sintox. This material, a product of Lodge Plugs, Ltd., Rugby, is sintered alumina and is quite distinct from carbide. Due to certain inherent properties it is ideal for machining materials which, although not requiring high force to remove chips, are nevertheless extremely abrasive and liable to cause early tool failure, as in the case of plastics, particularly those filled with wood, fibre, graphite or mica. Since the conductivity of this new product is only half that of tungsten carbide, the heat generated during cutting is repelled by the tip and directed to the swarf; therefore, as the swarf becomes soft, it serves as a secondary cutting fluid and actually assists the cutting action. Additionally, it has an extremely low coefficient of friction in comparison with conventional tool materials. Depth of cut can be as great as possible consistent with satisfactory swarf removal; very small depths may be employed for fine finishing. Cutting angles that control the swarf formation, i.e., the rake angles, should be slightly less than those employed for tool materials in general use. Clearance angles of about six degrees are suitable for plastics, with a secondary clearance of eight degrees. The extreme hardness is unaffected by temperature variation at the seat of cutting. B.S.A.-Sintox is distributed in Great Britain by Burton, Griffiths and Co., Ltd., Sparkbrook, Birmingham, 11.

INSTRUMENT MAINTENANCE.—The City and Guilds of London Institute announces the adoption of a new scheme of courses and examinations in Instrument Maintenance, which has been drawn up by an authoritative Advisory Committee. The scheme is intended to meet the needs of mechanics and technicians concerned in the maintenance, repair and installation of the instruments used for process and production control. Particular attention is given to the requirements of the chemical, iron and steel, and petroleum industries, to fuel economy, and to the needs of Service Departments. The course (part-time study) is of five years' duration, with an intermediate examination at the end of the third year, and a final examination at the end of the fifth year.

It is pointed out that the dearth of properly trained instrument maintenance mechanics has tended to be a serious handicap to the maintenance of instruments actually installed, and a deterrent to the full application of instruments in situations where their proper use could be of distinct advantage.

A pamphlet containing regulations and the syllabus for the City and Guilds examinations will be available shortly (price 6d.) from the City and Guilds of London Institute, Department of Technology, 31, Brechin Place, London, S.W.7. Further information about the above-mentioned scheme may be obtained from the same address.

METHYL STYRENE.—Dow Chemical Co., Midland, Michigan, announces that a new plant is to be built to make vinyl toluene (m- and p-methyl styrene). In all trials to date it appears that vinyl toluene will prove a satisfactory substitute for styrene in the manufacture of some synthetic rubbers, plastics and coatings. The Dow Chemical Co. has been aware of the impending benzene shortage because of a rapid growth in polystyrene production and increased use of benzene for agricultural chemicals, phenol and other products. Research and pilot plant work with methyl styrene were under way some time before the present critical shortage of benzene. The construction of the new production plant was authorized after a relatively short period of pilot plant operation.

GEON AT WORK.—A new illustrated booklet entitled "Geon at Work" has been published by British Geon Ltd. This provides for all industrial users the story of Geon polyvinyl materials in a series of recent trade Press announcements. Uses in the electrical, chemical, transport and shipbuilding industries, furniture and furnishing trades, and in the home are illustrated and described. An introductory section deals with primary Geon materials, and principal secondary forms such as calendered unsupported sheeting, coated cloth, extrusions and other products.

PLASTICS DATA.—The revised second edition of "Portfolio of Engineering File Facts," reprinting pages from "Materials and Methods," includes a section of 10 pages relating to the general properties, selection and application of thermosetting and thermoplastic materials. A scheme for the quick identification of plastics is included.

"ERINOID" POLYSTYRENE.—Erinoid, Ltd., Stroud, Glos., have sent us a copy of their new 12-page booklet on polystyrene, which is produced by Styrene Products, Ltd., a joint concern of Petrochemicals, Ltd., and Erinoid, Ltd. The booklet sets forth the electrical, mechanical, thermal and moulding properties of this material, together with brief information about injection moulding, cementing, machining, painting and lacquering. Injection-moulding temperatures are 300-500 degrees F., with pressures above 10,000 lb./sq. in.; compression-moulding temperatures, 260-350 degrees F., with pressures of 1,000-5,000 lb./sq. in. Mould shrinkage ranges from 0.002 to 0.005 inches per inch.

Erinoid polystyrene is available in the form of moulding powder, sheet and rod. An inch-thick slab weighs only 5½ lb./sq. ft. It is therefore one of the lightest of all thermoplastics and gives many more mouldings per pound of the powder. Mouldings can be washed in hot water without distortion from the effects of heat and water intake. At the other end of the temperature scale, Erinoid polystyrene can be used safely under the coldest conditions; physical properties are not seriously impaired even at the temperature of "dry ice." An unusual characteristic of the material is its ability to "freeze" light. This property coupled with the high percentage transmission of light and high refractive index (1.59) makes the material useful for display signs and, indeed, enhances the general appearance of all transparent mouldings.

Erinoid, Ltd., are the sole selling agents for Erinoid polystyrene, with R. H. Cole and Co., Ltd., as their sub-agents.

"BEETLE" MOULDING POWDERS.—A 72-page booklet published by the Beetle Products Co., Ltd., of 1, Argyll Street, London, W.1, offers assistance in the proper choice and correct use of "Beetle" and "Scarab" moulding powders, including "Beetle" melamine. It defines the properties and qualities peculiar to each powder and explains their usage, the different moulding techniques and various finishing processes. Moulding conditions for each grade of powder are separately set out, with detailed information upon moulding contraction, mould temperature, pressure, cure, preheating (oven and high frequency), and test for cure. A section on general moulding technique is particularly informative. As regards compression moulding the booklet covers lubrication of moulds, effects of mould design on pressure, press closing speeds, breathing, and temperature and cure time; there is similar useful information upon transfer moulding, e.g., choice of mould, recommended pressures, recommended mould and pot temperature, control of temperature in the pot and during transfer, and feeds and gates.

"PERMALI."—The electrical and physical properties and mechanical characteristics of "Permali," and detailed information on the applications of this homogeneous densified laminated wood to electrical switchgear, transformers, low voltage distribution, rotating machines, track circuit and overhead insulation, and traction control gear are set forth in a folder of illustrated leaflets sent to us by the New Insulation Co., Ltd., of Gloucester. Apart from electrical applications there is also extended reference to textile machinery, general engineering, silent gears, and pattern and core boxes for foundry use. "Permali" is available in the form of flat or curved sheets, rods, or machined parts, and the natural surface of the finished sheets has a high polish. The material can be sawn, planed, turned, drilled, tapped and screwed by aid of standard machine tools, but the best results are obtained on specially adapted high-speed woodworking machinery using abrasion resisting cutting tools.

BRITISH MOULDED PLASTICS, LTD., announce the following changes in administration, which become effective immediately:—

Mr. H. P. Bridge and Mr. F. W. Copeland have joined the board of Moulded Products, Ltd., and Mr. H. P. Bridge has been appointed managing director of that company.

Mr. B. A. Ensell has resigned from the boards of National Plastics, Ltd., and Moulded Products, Ltd. He has now been elected to the board of British Moulded Plastics, Ltd., and appointed resident works director at Walthamstow.

Mr. D. E. Lowndes, as works director of Moulded Products, Ltd., will be resident at Erdington.

The policy of the plastics interests of the companies concerned will be directed from 37, Portman Square, London, W.1.

MICHAEL S. STEVENS, dealers in plastics scrap, are changing their address in August from 14, Cambridge Park Mews, Twickenham, Middx., to Keswick Works, 11, Keswick Road, Putney, London, S.W.15.

ALFA PLASTICS LTD., 20, The Highway, Stepney, London, E.1, inform us that their injection moulding capacity has been increased appreciably and they can now accept additional work for the trade for customers with own tools.

ERINOID, LTD., announce that Mr. Mark Gardner, sales manager of the company, and Mr. William R. Merton, have been appointed directors of the company.

SUFLEX, LTD., announce that Mr. J. K. Straker has taken service with them as assistant sales manager. Mr. Straker, who is an associate member of the Institute of Export, will concern himself with both home and export matters.

MR. R. S. COLBORNE, formerly with B.X. Plastics Ltd., has joined the Greenwich Leathercloth Co. Ltd. as general manager.

INTERNATIONAL CORPORATION, LTD., 19, Ebury Street, London, S.W.1, inform us that the company represents in this country Hermann Berstorff Maschinenban Anstalt G.m.b.H., of Hanover, Germany. The latter company have long produced machines for the plastics industry, e.g., extruders and calenders.

P.I.G.S.—The Plastics Industry Golfing Society held a meeting at West Hill Golf Club on May 22, when about 50 members and guests attended.

The "Airborne" Trophy, which was presented by Mr. Sidney Welch on behalf of Mr. John E. Ferguson, was won by J. M. Davie (Hadley Co., Ltd.), one down against bogey. The runner-up was J. N. Smith (Erinoid, Ltd.), one down against bogey. John Davie won the Trophy with the better score for the last nine holes.

The "Plastics" Goblets (foursomes), presented by Mr. Roland E. Dangerfield, were won by R. F. Johnson (Bakelite, Ltd.), and G. W. Brown (R. H. Cole and Co., Ltd.). The runners-up were J. M. Davie (Hadley Co., Ltd.), and B. T. Francis (Bakelite, Ltd.).

MOULDING POWDER IMPORTS.—The British Plastics Federation reports the following details of private account imports of moulding powders for April, 1951:

	Licences issued. (tons)	Arrivals. (tons)
Cellulose acetate butyrate (U.S.A.)	43.7	14.1
Polystyrene (U.S.A.) ...	0.9	—
Polystyrene (Canada) ...	6.6	117.4
Cellulose acetate butyrate (Germany)	—	1

Members of the Swedish Plastics Federation recently visited the works of British Moulded Plastics, Ltd., at Walthamstow. They are seen here with Mr. H. P. Bridge (centre), managing director of British Moulded Plastics, Ltd. Mr. Jan-Erik Janson, managing secretary of the Federation, is seen to the right of Mr. Bridge.

Machines for the Industry

The "Shaw" 4½-in. Plastics Extruder

Since building their first screw-extruder in the year 1879, Francis Shaw and Co., Ltd., of Manchester, have specialized in the production of such machinery. In this article, a recent and up-to-date addition to their range is described.

THE Francis Shaw 4½-in. extruder, for thermoplastic materials, is used for the continuous production of tubing, belting, or miscellaneous sections, and for the insulating and sheathing of cables. It can also be used in processes requiring the delivery of a regulated amount of milled and molten material for sheeting or coating purposes.

Constructional Features

The machine is driven by a 30/10 h.p. variable speed A.C. motor, the speed control being by induction regulator. From the motor shaft there is a multi V-belt drive to the double reduction gear unit (4), the latter having gearwheels of the double-helical type, with shafts mounted on the ball or roller bearings throughout.

The output shaft from the speed reducer is connected by splined joint to the extruder screw, as shown in Fig. 3, and a taper roller thrust bearing (8), included in the gear unit assembly, takes the back-thrust of the screw as it forces the plastic along the barrel and out through the die. Lubrication of this thrust bearing is by a small, mechanically driven pump, and an oil flow indicator (7) is fitted in the feed line. Lubrication of the other shaft bearings is by splash, and the gears, of course, run in oil.

The cast-iron feed-box and sheet-steel hopper-extension (9) into which the granulated thermoplastic is fed, encloses the start of the threaded portion of the screw, and a driven feed roller (20) can be included if desired to assist intake. The feed box is water-cooled, as is also the flange which connects the extruder barrel to it.

Different designs of screw are available for different duties, but generally the length is approximately equal to 15 diameters. Compacting of the plastic is obtained by gradually decreasing the thread-depth towards the delivery end. Both screw and barrel are of hardened alloy steel, with only a few thousandths

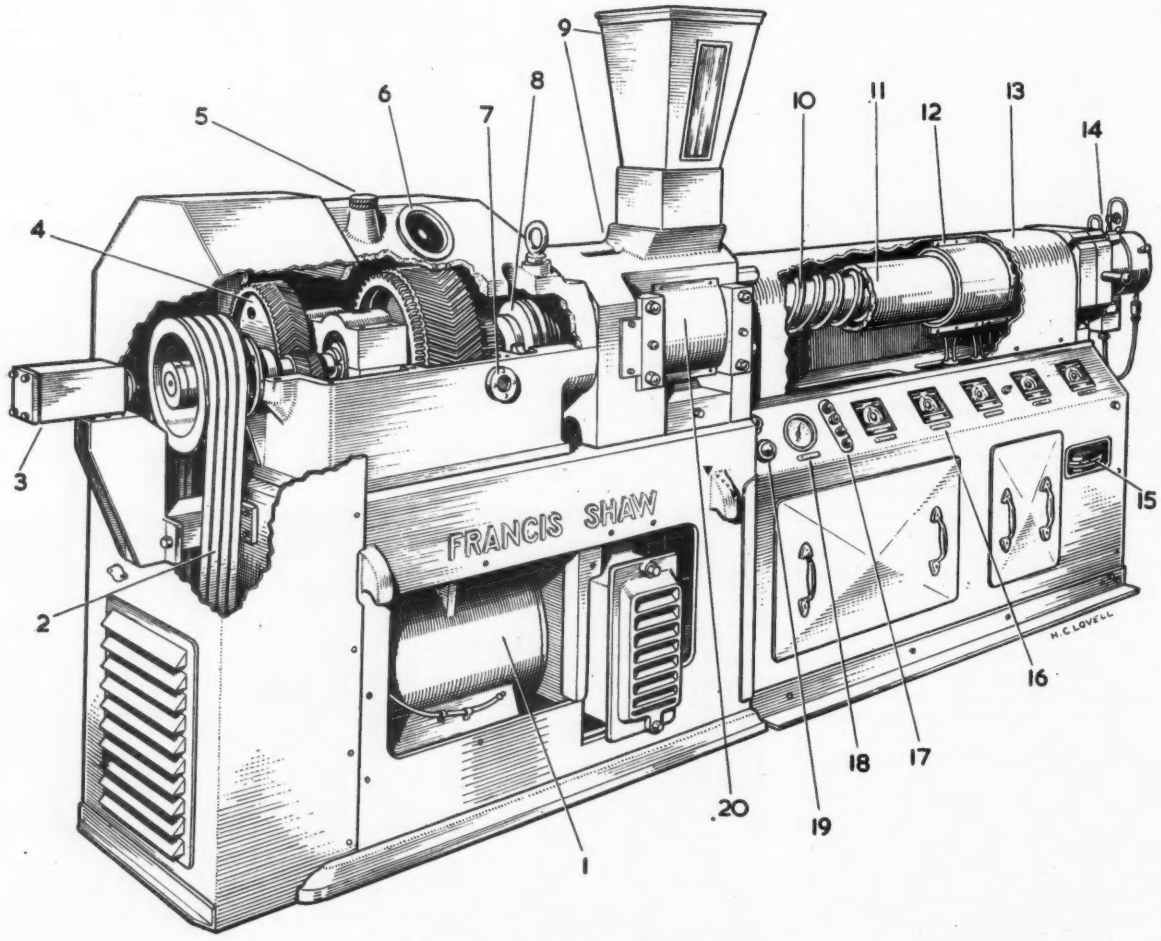


Fig. 1.—The "Shaw" 4½-in. plastics extruder.

1.—Variable-speed driving motor. 2.—Multi V-belt drive. 3.—Water-cooling feed and drain box for screw. 4.—Double reduction gear unit. 5.—Oil level dipstick. 6.—Screw speed indicator. 7.—Oil flow indicator (thrust bearing lubrication). 8.—Thrust bearing. 9.—Feed box and hopper-extension. 10.—Extruder screw. 11.—Extruder barrel. 12.—Barrel heaters. 13.—Barrel cover. 14.—Die-head assembly. 15.—Temperature controlling instrument for die-tip. 16.—Temperature controlling instruments for barrel and die-head heating zones. 17.—Push-button station. 18.—Indicating instrument for feed box temperature. 19.—"Current on" indicator lights. 20.—Feed roller housing.

of an inch radial clearance between the two. In every case the screw is designed for water-cooling.

Fig. 1 shows the barrel partially cut away and some of the barrel heating elements removed, to reveal a part of the screw. Actually, the whole length of the barrel is heated by electric elements of the type shown in Fig. 2, these being separately controlled in zones, two heaters to each, by the thermostats (16), which also indicate the temperatures. The feed-hopper temperature is indicated by the instrument (18).

The die-head assembly, into which are incorporated flanges for hinged opening; perforated baffle plate to accommodate gauge screens; air feed to the centre of extruded tubing, and interchangeable dies, etc., is also electrically heated and thermostatically controlled. The die itself, which generally gives the finished shape to the extruded product, has an electric heating element of its own and a separate instrument (15), for accurate temperature control at this critical final stage of the extruding operation.

The screw speed is indicated on a dial (6). The speed range is 3/1 stepless and the machine is normally made with a range of 25/75 r.p.m. By the fitting of alternative V-rope pulleys, however, this screw speed range can be altered to 16/48 r.p.m., or even to 8/24 r.p.m., to cope with a heavier-than-normal duty, requiring only low speeds but with maximum power at those speeds.

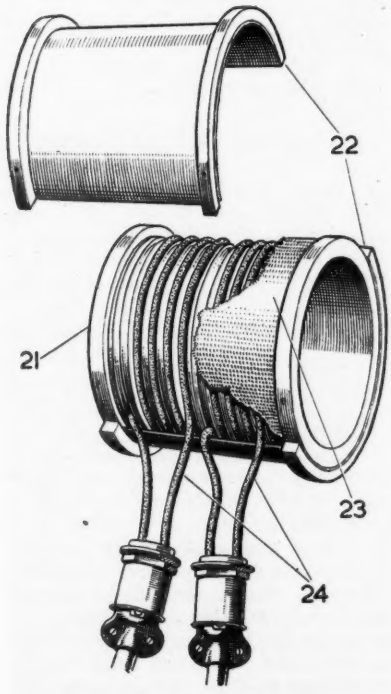


Fig. 2.—Barrel heating elements.

21.—Thin steel sleeve (grooved for heaters, sliding fit on extruder barrel). 22.—Steel outer shell. 23.—Asbestos lagging. 24.—Heating elements.

Operating the Machine

After the current has been switched on to the heaters, the temperatures of each of the zones on the barrel and die-head will begin to rise. The temperatures indicated on the thermometer regulators (16), are, of course, those taken at the points of measurement (generally between the heating elements) and not necessarily those of the plastic itself at that stage of its progress towards the die. They are quite satisfactory, however, for setting purposes, and once the ideal indicated temperature arrangement has been found for a particular duty, this can be noted for future resetting. The regulators, in addition to the temperature - indicating finger, have a superimposed finger of different shape and colour which can be set, by the turning of the small centre knob, to any required temperature value. When the indicating finger reaches the position of the pre-set finger, on the scale, the current supplied to the heater is cut off, only to come on again when the indicating finger falls.

Having set each regulator at the recommended temperature value, and reached those required temperatures, the machine is started up by pressing the appropriate button at (17). On the standard machine, the screw will then be running at about 25 r.p.m., indicated at (6).

Granulated p.v.c. or other thermoplastic is then fed into the hopper, the level being shown at the window in the front face of its upper extension. This plastic will be conveyed by the screw, along the barrel, collecting heat from the barrel heating zones and by reason of

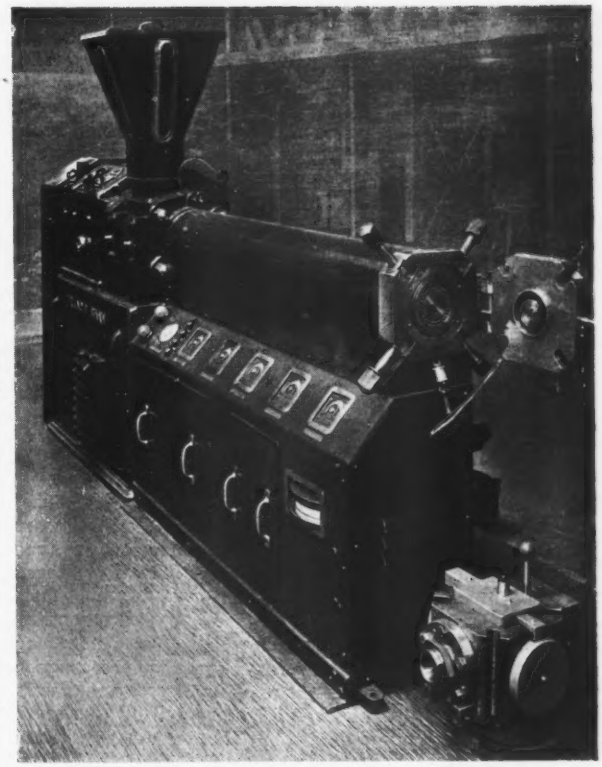


Fig. 4.—The "Shaw" 4½-in. plastics extruder, as exhibited at the recent British Plastics Exhibition in London.

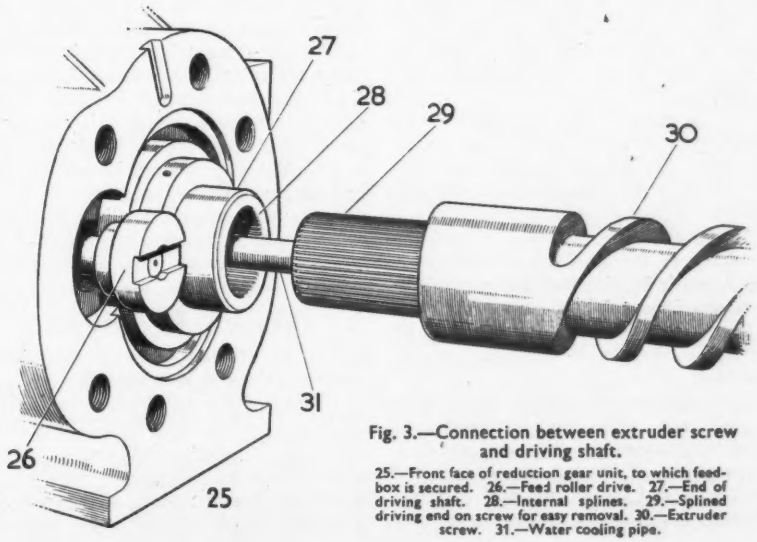


Fig. 3.—Connection between extruder screw and driving shaft.

25.—Front face of reduction gear unit, to which feed-box is secured. 26.—Feed roller drive. 27.—End of driving shaft. 28.—Internal splines. 29.—Splined driving end on screw for easy removal. 30.—Extruder screw. 31.—Water cooling pipe.

the milling work done upon the thickness of plastic in the flow channels. By the time the plastic reaches the die-head it is in a thick fluid state, which enables it to flow through the die, from whence it is pulled and cooled by suitable take-up equipment.

The screw speed can be increased at the push-button station, by pressing the "accelerate" button, and releasing the pressure when the required speed is reached. Speed can be reduced in the same way by the use of the "retard" button. A fourth button is for stopping the machine. In all cases there is a maximum speed for satisfactory extrusion and for some plastics this may be quite low. The ideal speed for a given duty should be noted along with the temperatures.

A watch should be kept on the feed hopper temperature, and in many cases use of the water cooling will be found to be essential in order to prevent a too early melting of the plastic granules. This could cause "bridging" across the feed gap and difficulties in getting the material into the machine.

Water cooling of the screw in many cases is also essential to keep a consistently good extruded product.

Suitable sizes and combinations of gauze screens are generally used in the die-head assembly, and the advice of both material and machine suppliers can be sought in the initial design of dies, there being a good many headaches in this part of the technique.

The die-head shown on the machine in Fig. 1 is of the "straight-through" type. Other kinds of die-head, including "right-angle" for wire covering, are available. In both cases, centring screws are provided for adjustment of outer die to give concentricity in wire covering or tubing production.

Book Review

"Plastics Moulding Engineering." By M. Freund, Dipl.Ing., M.I.Mech.E. Sir Isaac Pitman and Sons, Ltd. 45s.

We are indebted to Mr. Freund for a very useful contribution to the literature on the engineering of plastics moulding. The book is profusely illustrated with photographs, diagrams and tables. The reviewer was particularly struck by the wealth of detail in the various appendices and tables at the end of the book. The formulæ for mensuration are extremely full and the various conversion tables and units in Appendix 5 are a valuable contribution to the desk or shelves of any practical man in the industry. Two omissions which would be useful when the book is reprinted would be some mention of Joule's equivalent of heat, and distinction between British and American gallons.

After a brief introduction the author deals successively with tooling for compression moulding, tooling for transfer moulding, and tooling for injection moulding. Sliding moulds, the three-plate mould, and methods of unloading are ably dealt with. A section on automatic moulding, together with notice of the machines used, is introduced into the chapter on tooling for thermosetting mouldings.

Mr. Freund bases his theory for transfer moulding on the "hydrostatic" principle. He assumes that at some stage of the cycle the material becomes truly plastic, which is a safe assumption.

The author also bases the injection moulding of thermoplastics on the same "hydrostatic" principle, but modifies it because of the pressure drop through the gate and into the mould, and assumes that an area of double the theoretical can be moulded.

The chapter on stresses in plastics moulds is a useful contribution and is helped considerably by the excellent photographs of broken moulds, so that the reader can see by practical examples where previous designers have made their errors. Emphasis is paid to the importance of radii and high finish to avoid stress concentrations, but it is pointed out that certain corners must be made and that these produce stress concentrations.

Very few engineers have had Mr. Freund's experience of the moulding of large components, and his contribution to this subject is particularly valuable, especially when he deals with the stresses involved and the reason for failure of dowels. The reviewer was pleased to see emphasis laid on the correct clamping of the moulds to the press.

In the chapter on "Heat in the plastics moulding shop" it is evident that Mr. Freund is an advocate of low tension electric heating, but mention must be made of his excellent description of high-pressure hot water heating. If criticism might be offered regarding the chapter on hydraulics in the moulding shop, it is that some mention of the area of the push-back rams should be given as these often operate at full high pressure throughout the whole length of the return stroke. In addition to the measured watts used per lift of press in assessing power, the theoretical value might also have been given, assuming 100 per cent. efficiency on the pumps and no water leaks. It would appear that the whole of this chapter is based on the assumption that water is the only hydraulic medium in general use and that screw-down control valves are always used. Some mention of piston valves and oil operation might have been a valuable addition. J.L.D.

Books Received

"British Plastics Year Book, 1951." London: Iliffe and Sons Ltd. 30s.

"British Chemical Plant, 1951." London: British Chemical Plant Manufacturers Association.

"Glossary of Terms used in the Paint, Varnish and Allied Industry." By H. W. Chatfield. London: Scott, Greenwood and Son, Ltd. 30s.

Letters

Electric Heating for Moulds

SIR,—Can you put us in touch with a manufacturer of electric heating bands suitable for compression moulds?

MOULDED PRODUCTS, LTD.
North Circular Road,
Tralee, Co. Kerry.

[EDITOR'S NOTE: Specialists in this form of heating for compression and injection machines are Perkins and Seward, Ltd., 56, St. Mary Street, Cardiff. We believe that the General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2, and M. Calderon, Ltd., 227, Upper Street, London, N.1, also make such elements.]

P.V.C. Tubes for Toothpaste

SIR,—Could you inform us whether there are any manufacturers of white flexible p.v.c. tubes with a screw cap, suitable for packing toothpaste?

PLAXPEX PRODUCTS (LIVERPOOL).
123a, Mount Pleasant,
Liverpool, 3.

Styrene Copolymers for Shoe Soles

SIR,—We are interested in the manufacture of natural rubber compounded with styrene copolymers, which is suitable for the soling of women's and men's shoes (see "Cutting Styrene Cake," in "Plastics," May, 1951, page 114). Can you give us any further information?

ARMSTRONG CORK CO., LTD.
(Industrial Division).
Kingsbury, London, N.W.9.

[EDITOR'S NOTE: The information which we published was received from the company mentioned in the note in question. For further information, we suggest you get in touch with the Research Association of British Rubber Manufacturers, 105-7, Lansdowne Road, Croydon, Surrey.]

Loudspeaker Frets

SIR,—Can you suggest possible sources of supply for woven plastics material suitable for covering the speaker frets of radio cabinets? We are already familiar with Rotalac, Tygan and Somic, but are wondering whether there are other alternatives.

GORDON RUSSELL LTD.
Broadway, Worcs.

Successful Designing for Plastics Moulding—XXII

By W. M. HALLIDAY

Consideration is given to the various design factors involved with "coring" to illustrate their great influence on mould design, economical manipulation of that tool, and most satisfactory results in the finished product.

VARIOUS forms or types of core plugs and mouldings are available for use with both compression and injection moulds. These include the relatively simple and inexpensive solid steel plug permanently affixed within a mould block, from which the finished moulding has to be stripped in some manner.

The core plug may be detachable from the housing in the mould block, being removed with the moulding after each "shot" or "lift." Sliding, rotating, split or collapsible core plugs may also be employed, often with much success, but their use will depend largely upon the requirements of the particular hole formation, its location relative to the main parting-line joint of the mould, and their effects upon the resultant complexity of the mould construction.

Such movable cores may be designed for simple manual actuation in the mould, or the latter may be equipped with a fully or partial automatic mechanical movement for operation of the core. Sliding and rotating core plugs incorporated in an injection-type mould will be specially suited for this latter method of operation, and very many ingenious mechanical arrangements can be designed to accomplish automatic manipulation of one or more cores, simultaneously with the other normal opening and closing motions imparted to the mould.

Movable core plugs required to operate along a straight-line path lying parallel with the main parting-line surface of an injection mould, to form a hole in the side wall of the part, will generally be mounted in a special retracting slide guided in a recess cut into the main mould block.

This is a very common and extremely useful constructional method, and will generally assure effective guidance for the core plug, maintaining it always in the correct alignment or relationship with vital portions of the mould cavity. It will also permit the core to be extracted from the wall of the component simply and quickly, before or during the normal opening movements of the mould. Long working life will also be ensured to the core plug, since with this form of mounting the latter element will usually not be in close frictional contact with the mould block.

Very often, when holes of exceedingly small diameter and long length are required (as corings), the necessary core plug in the mould will be of very slender proportions, and thus may possess an undesirable degree of fragility to enable it safely to withstand the heavy pressures, and severe abrasive action, arising from intimate contact with the flowing material. This will be particularly the case with compression moulds, and many of the moulding powders used.

There is, therefore, a limit in respect of minimum hole dimensions, permissible with both injection and compression moulds, if the use of core plugs is to be adequately safeguarded and reasonable working life ensured.

An unduly weak core plug, for example, will be liable to distortion, bending, or even complete fracture. On the other hand, if particularly close tolerances have to be observed in respect of some small-diameter hole, the core plugs may very quickly wear, due to the abrasive action of the powder and flowing material in the mould, and so critical sizes would speedily be lost.

The proclivity towards rapid wear with cores in a compression mould will often give rise to considerable objections, especially if close limits have to be observed in respect of the finished hole. Special precautions will have to be taken by the mould designer in determining the size of core plug to be used, and an equal amount of care by the moulding engineer when working the tool, to ensure wear, etc., does not cause a departure from those limits.

It is usual design practice in these circumstances to make the original core plug to the maximum upper limit of the diameter of the finished hole. The resultant wear on the plug will be closely checked at regular intervals, and when its diameter has worn to the bottom limit permissible on the finished hole, the core plug will be discarded and a new member fitted.

For these reasons, it will be understood that the greater the disparity between upper and lower limits on a hole dimension, that is, the wider the tolerance permitted to the mould engineer, the longer will be the working life obtainable from a core. Thus, by specifying the widest possible tolerances on all hole dimensions, diameter, as well as length, longer working life will be obtained from the cores, and a more economical operation of the mould assured.

This reasoning applies in a lesser degree to cores employed with injection moulds, where the abrasive action and drag of the plasticized material will not usually be as great as with compression moulds.

The relationship between the location of the core plug and its line of interjection into the mould cavity is again of the greatest practical importance, and should always be carefully determined by the product designer before specifying the hole positions.

With both compression and injection moulds, core plugs have always to be situated so that they will not retard, or unduly deflect, the main flow of the material during cure, or during injection into the cavity area. If core plugs are improperly disposed in this connection, they suffer greater liability towards distortion and fracture, and, moreover, the walls of the component may have greater tendency towards cracking and warpage. The ejection of the finished component will also be rendered more difficult.

There are, of course, numerous instances where holes are required of too small a diameter for successful coring in the mould, because of the reason mentioned. The values given in Table 1 afford a useful indication of the minimum diameters and lengths of hole permissible. It will also be observed that the holes are classified according to whether they are blind, or pass wholly through the wall of the component.

The diameter capable of being moulded by a core will be closely related to the length of projection of the critical portion into the mould cavity and also whether this portion is guided and supported by passing into a bearing hole at the opposite side of the cavity or is unsupported. Where the hole diameter is too small for satisfactory coring it will often be possible to use a shortened core plug having a conical tip to mould a small dimple in the wall of the component. This feature would then indicate accurately the position of the hole, the dimple acting as a centralizer for the twist drill or other tool required for later boring the hole by orthodox machining methods.

Types of Core Plugs for Hole Formation

There are innumerable designs of core plugs and methods of mounting same in the mould. All these, however, fall broadly into one of three types which designations refer to the manner in which the critical portion of the core plug is positioned in relation to the mould cavity.

These three types are illustrated by the three simple enlarged diagrams shown at Fig. 1, which in every case depict a cross-

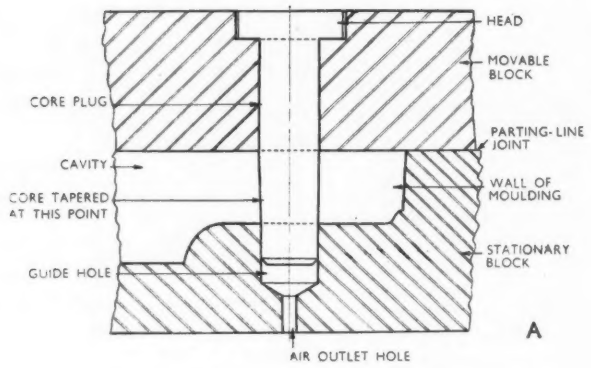
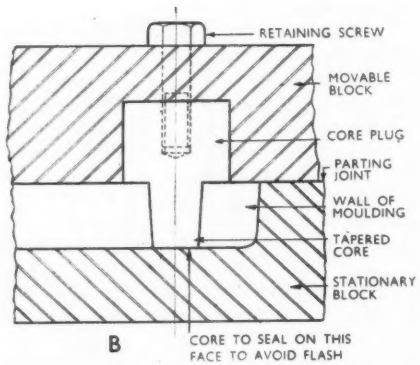


Table I.—Length of projection of core plugs for blind and straight-through holes.

Hole diameter in moulding (core diameter)	Max. length of blind hole to be cored	Max. length of hole cored straight-through moulding
in.	ins.	ins.
1/16	1/16	1/8
3/32	1/8	1/4
1/8	7/32	3/8
5/32	9/32	17/32
3/16	11/32	3/4
1/4	7/16	15/16
5/16	5/8	1 3/16
3/8	3/4	1 3/8
7/16	15/16	1 5/8
1/2	1 1/16	2
5/8	1 5/16	2 1/2
3/4	1 5/8	2 3/4
	Max. length of core plug to be used	Max. length of core plug to be used



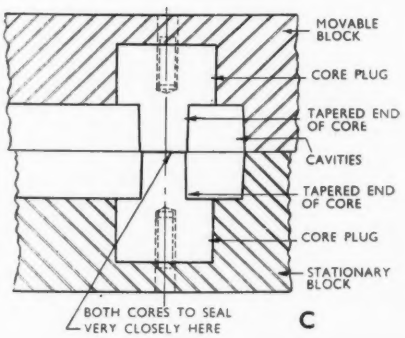


Fig. 1.—Diagrams showing the constructional features of three types of core plug :—

A (above)—"Straight-through."

B (left)—"Landed."

C (right)—"Abutting."

section of the relevant portion of the mould. They are known as "straight-through," "land" and "abutting" forms of core plug. When a hole has to be cored completely through the wall of a component it may be formed by one of three types of core plugs depicted A to C.

Considering the first design form shown at A, the core plug is fixedly mounted in a movable mould block, having an enlarged head let into a recess in the face of the block, to prevent the core from being pulled out of the block during the opening movement.

The shank of the core plug projects beyond the parting line joint of the two blocks, so as to traverse completely across the cavity required to form the necessary wall portion, and to pass, for only a short distance, into a guide hole machined in the base of the cavity in the stationary mould block, in the manner clearly depicted.

Alternatively, design B may be adopted. Here the core plug is affixed into a large-diameter blind recess or housing machined in the movable mould block, being retained therein by a set screw situated at the rear, or by any other convenient means. In certain cases the plug may be fitted in a detachable manner within this mould block, to be capable of being withdrawn along with the extracted component when the mould blocks are parted.

The reduced critical working end of the core plug interjecting into the cavity area will be made in length equal to the thickness of the wall of the component being cored. No guiding or pilot hole is therefore required to align and support the forward end of the core plug.

If the third core design form as illustrated at C is employed, the hole in the component may be formed by means of two core plugs, one being mounted either in a fixed or a detachable manner in a blind recess formed in the movable mould block, and the second plug mounted fixedly in a similar recess in the opposite stationary block.

The length of the critical working portion of these two cores may be made identical, as shown in the present diagram, or, as sometimes occurs in practice, it may be advisable to make the core plug housed in the movable block slightly longer than the opposed plug, so that the two members will seal together closely on a line somewhat below the normal main parting line surface of the mould.

The latter simple modification may be found necessary in order to ensure that the finished moulded article will always be drawn out of the cavity formations in the stationary mould block by reason of the slightly greater shrinkage pressure arising on the longer core plug in the moving block.

With design A it will be observed that the core plug passes completely through the wall of the component being moulded, and is piloted in the stationary block, hence the term of designation applied to this design.

The core plug in design B has to "land" upon the floor of the cavity in the fixed block, sealing thereon when the mould is properly closed, which feature indicates the term "land" core plug.

With design C, two cores are set to "abut" against each other at a certain point to ensure continuity of hole through the component.

The relative merits of these three design types will be well worth while enumerating and considering in some detail, because they will usually arise for consideration when evolving any component and mould designs.

Wherever possible the design A should be selected, especially in the case of injection moulds. This design is particularly well adapted for the formation of holes of relatively small diameter and considerable length, because—as will be noted—the core plug in the working position when the mould is closed will be supported by engaging within both mould blocks. Piloting or guiding the front end of the core after this fashion will ensure the maximum stiffness and rigidity to the member, and will maintain it in correct alignment so that a more accurate hole will be formed in the component, and far less liability towards wear, deflection and misalignment of the core.

Design A will also result in the minimum amount of flash occurring on the sides of the component. Providing the front end of the core plug, piloted in the guide hole in the floor of the cavity, is maintained a close fit, a very small

flash should arise. Such flash will be formed only as a narrow circular ring on the side of the component, the diameter of which ring will be coincident with that of the core plug at that piloted point.

This flash ring will also be slightly raised above the normal wall surface, lying in fact at right-angles to that surface, and thus will be disposed in such a manner to permit its later removal by the simplest buffing or trimming methods and tooling.

That portion of the core plug transversing the actual cavity area must be provided with a slight taper, as indicated, to facilitate extraction of the finished component, which will be accomplished usually by forcing it off the core by means of push-type ejector rods mounted in the movable block.

The end of the core plug engaging within the pilot hole in the stationary mould block will be made parallel for the length of that engagement, but the diameter of the core, and the mating hole at this point, will be smaller than the diameter of the part in the housing in the moving block.

Provision should preferably be made for the ready escape of air along the lower end of the pilot hole in the stationary block, in the manner illustrated. A smaller-diameter outlet hole will usually be found quite satisfactory for this purpose.

Turning to example B, that is, the "landed" type of core plug, this is really most satisfactory for coring blind holes of short length, and/or when the diameter of the hole is considerable in relationship to its length. If a hole has to be formed fully through the wall of a component, as depicted, it will be apparent that certain difficulties or objections may easily arise. For instance, any accidental failure of the mould blocks to close properly along their main parting joint will result in a similar failure to seal where the end of the core plug bears down upon the floor of the cavity formation. Thus flash would be formed at the end of the hole.

This flash, however, unlike the preceding example, would occur not as a shallow narrow ring around the edge of the hole, but in the form of a solid disc of material which would blank up that end of the hole completely. To remove such disc flash would entail a drilling or cropping operation with a twist drill or punching tool fed completely through the hole.

Secondly, the critical working end of the core plug is anchored or supported only in one mould block, and distortion, bending, wear, and even complete fracture, will be more liable to occur.

Thirdly, such bending or misalignment of the core plug would result in increased difficulties when ejecting the component due to the core lying slightly off the true line of ejection. This in turn would incur considerable risk of damaging the finished article during ejection. The critical dimensions of the finished hole, especially the degree of parallelism obtained, would similarly be prone to suffer by reason of such bent or misaligned core plug.

Further, when fitting such a core plug into the mould blocks, very accurate machining of the working end, and equally accurate fitting of the piece, would be required to ensure that the portion intersecting the cavity area would be exactly the correct length to effect a flash-proof seal with the floor of the cavity when the mould is closed.

The manufacture of this form of core plug would therefore incur greater cost than the previous example at A, and the maintenance requirements would be likewise of a more stringent character, particularly if the length of projection of the core should exceed about twice its diameter.

The core design shown at C is particularly well suited for the economical reproduction of long holes, providing the diameter is not too small. This design ensures freedom from flash formation, either in ring or disc form at the ends of the hole, but a disc flash is liable to occur at the point where the two core plugs seal near to or at the parting line joint of the mould.

Accidental opening of the mould blocks at this parting joint would result in such flash being formed, and, unfortunately, this would be situated well down the finished hole and thus prove more difficult to remove. Further, since each plug is supported only at one end, the risks of distortion, bending and misalignment noted in connection with example B would apply equally in this case.

In addition, extreme care will have to be observed when fitting such core plugs to ensure they are mounted perfectly in line with each other. This alignment would also in some measure be conditioned during later working by the accuracy and closeness of fit of the main guide dowels aligning the two mould blocks. Any wear or errors occurring with these latter members would, of course, be transmitted to the core plugs, and thus in such circumstances a hole may be formed in the finished component having cross-alignment and slight steps at each side.

In order to circumvent this undesirable condition it is customary practice to make the working end of the core plug housed in the stationary mould block slightly smaller in diameter or other vital dimensions in the case of a square or polygonal plug. Reduction in size ranging from about .02 in. to .03 in. per inch of core diameter will usually be found sufficient to take care of misalignments occurring from the above-mentioned causes.

In cases where one such core plug has to be made detachable from the mould block (usually this will be the top moving force), additional errors may arise in respect of the axial accuracy of the cored hole.

This form of core-plug design will also prove somewhat more expensive in manufacture than either of the preceding forms, but this will not prove a serious consideration.

Mould designers often employ a slightly adapted form in order to guard against misalignments of the kind mentioned and to impart greater rigidity to the projecting portions of the two cores. With such an adaptation, one of the core plugs will be formed with a smaller-diameter pilot shank capable of engaging closely within a hole machined in the matching end of the other plug. Thus, when the mould is closed, the pilot on one plug will pass into the hole provided in the other member, thereby positively anchoring the two parts together.

This modification will only be permissible when the diameter of the hole, and core plugs, is sufficiently large to permit fashioning a reduced guiding pilot on one member of adequate strength to serve the purposes in view. It will also be apparent that the strength of such a reduced-diameter pilot will always be very much less than the support afforded by the maximum-diameter core plug in the example A.

(*To be continued*)

PLASTICS RESEARCH AT B.T.H. LABORATORY

In the constant search for new and improved insulating materials at the British Thomson-Houston Co.'s Research Laboratory at Rugby, during 1950, special attention has been given to the possibilities of synthetic rubber, solventless varnishes, and bitumen-bonded "micafolium" for stator coil insulation.

A gasket material for oil-tight joints for transformers, which can be used repeatedly and is resistant to transformer oil, has long been a requirement in transformer manufacture, and promising results have now been obtained with nitrile rubber. Another application of synthetic rubber is to the insulation of high voltage current transformers. This material—a mixture of polyisobutylene and isoprene—has been used for a moulded covering for current transformer coils, in place of the standard method of taping with varnished cloth tapes.

Solventless varnish impregnation, with the consequent elimination of voids due to the evaporation of solvents, has been successfully applied to aircraft magneto coils, and a casting resin has been used for the production of crystal rectifiers with moulded bodies. Experiments are also proceeding, in collaboration with the Micanite and Insulators Co., Ltd., regarding the use of bitumen stickers for the development of a bitumen-bonded "micafolium" for application to generator stator coils.

In another sphere of research the growing demand for a cheaper germanium crystal diode, to replace the thermionic and metal rectifier types, has led to the development of a type using a thermosetting plastic material to enclose the crystal and the cats-whisker.

PATENT REVIEW

The following abstracts have been made from specifications at the Patent Office, with the permission of the Controller of H.M. Stationery Office. Complete specifications can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 2/- each.

B.P. 650,324. Appl. 16.1.48. Conv. (U.S.A.) 24.2.43. Acc. 21.2.51.
Method of producing formaldehyde condensation products. N. T. Harvey. To: Harvel Research Corp.

B.P. 650,337. Appl. 20.12.48. Acc. 21.2.51.
High-frequency electric heating apparatus. A. G. Stainsby. To: General Electric Co., Ltd.

High-frequency apparatus for the heating of thermoplastic strip material or natural rubber in strip form consists of a waveguide provided with slots. The strip travels through the slots and is subjected to electromagnetic action in the interior of the wave guide which is energized from a suitable Magnetron circuit. A wavelength of 12 CM is mentioned.

B.P. 650,358. Appl. 8.10.48. Acc. 21.2.51.
Film-forming copolyesters and films thereof. O. B. Edgar and E. Ellery. To: I.C.I., Ltd.

Process for the copolymerization of esters of ethylene glycol and terephthalic acid and adipic or sebacic acid for the production of flexible films.

B.P. 650,399. Appl. 21.5.48. Conv. (U.S.A.) 23.5.47. Acc. 21.2.51.
Dispersions of fluorine-containing polymers. To: E. J. du Pont de Nemours.

An aqueous colloidal dispersion of polytetrafluoroethylene containing a water soluble surface-active agent in admixture with an aqueous dispersion of a colloidal hydrous oxide sol is prepared for the purpose of coating metallic surfaces with a layer of polytetrafluoroethylene.

B.P. 650,548. Appl. 17.12.47. Acc. 28.2.51.
Centrifugal extrusion apparatus. N. N. Spier and E. Phillips. To: Locke, Spier and Co.

A rotating bowl with a multiplicity of holes on the circumference is filled with thermoplastic material under air pressure and filaments of the thermoplastic material are extruded through the openings. The air is used for heating the material at the same time.

B.P. 650,609. Appl. 16.12.48. Acc. 28.2.51.
Processing thermosetting plastic material and apparatus therefor. C. E. Hedin. To: Hedin, Ltd., and British Moulded Plastics, Ltd.

Preheating oven for thermosetting moulding powder is provided with a steam jet for heating the material on a wire tray. Superheated steam is used to obtain sufficiently high temperature for preheating.

B.P. 650,682. Appl. 16.1.47. Conv. (Switzerland) 18.1.46. Acc. 28.2.51.
Coated or impregnated fabrics of glass fibres. To: Ciba, Ltd.

Refers to impregnation of woven glass fibre cloth with polyvinyl compounds such as polyvinyl acetate, chloride or copolymers of the two compounds.

B.P. 650,692. Appl. 17.6.47. Conv. (U.S.A.) 28.11.44. Acc. 28.2.51.
Injection mould for use in moulding ophthalmic lenses and other articles. To: Teksun Inc.

Split mould with a number of inserts can be used to mould a variety of lenses with various optical characteristics.

B.P. 650,698. Appl. 16.10.47. Acc. 28.2.51.
Manufacture of sausage skins or cases. M. Brainos. To: Brainos and Co., Ltd.

High-frequency welding of sausage skins of polythene film, using an intermediate layer of thermoplastic material which is heated in the high-frequency field, the heat being transmitted to the polythene film by contact.

B.P. 650,715. Appl. 7.5.47. Conv. (U.S.A.) 10.12.46. Acc. 28.2.51.
Forming particles of thermoplastic material into a sheet or film or impregnating flexible sheeting with thermoplastic material. J. S. Tinsley. To: Hercules Powder Co.

B.P. 650,784. Appl. 30.7.47. Conv. (U.S.A.) 19.12.45. Acc. 7.3.51.
Plastic films and process for producing same. M. A. Chavannes. To: G. T. Traut.

Manufacture of plastic films with a glassy "undulating" surface. Vinyl chloride/vinyl acetate copolymer dispersions are used to coat a carrier film, swelling is produced and after heat treatment the plastic film is detached from the carrier film. See also 650,786.

B.P. 650,787. Appl. 7.8.47. Conv. (U.S.A.) 17.5.40. Acc. 7.3.51.
Coating and impregnating compositions. To: Harvel Corp.

A composition which comprises a hydrocarbon ether of an Anacardiacæ phenol, in admixture with a non-drying glyceride oil, the hydrocarbon ether being polymerized.

B.P. 650,800. Appl. 27.8.47. Conv. (U.S.A.) 27.10.46. Acc. 7.3.51.
Stabilizing organo-substituted polysiloxanes. To: British Thomson-Houston Co., Ltd.

B.P. 650,916. Appl. 5.10.48. Acc. 7.3.51.
Production of cast or otherwise moulded enlarged or reduced facsimilies of objects. To: Vinyl Products, Ltd.

Method of soaking a resinous "hot melt" compound (such as "Vinamold") in an organic solvent and allowing the mould made from this compound to expand or contract. The resulting shape of the mould will permit the casting of enlarged or reduced size objects from this mould.

B.P. 650,923. Appl. 3.12.48. Acc. 7.3.51.
Production of coloured filaments or fibres of polyethylene terephthalate. R. Hardwick and L. Wood. To: Imperial Chemical Industries.

Polyethylene terephthalate is spun into fibres which are treated with a diazonium compound, the fibre containing already a dissolved azo coupling component.

B.P. 650,949. Appl. 19.9.47. Acc. 7.3.51.
The production of new polymers. M. M. Szwarc.

New polymer produced by the pyrolysis of para-xylene vapour and subsequent cooling of the pyrolysed vapours.

B.P. 650,990. Appl. 10.6.48. Acc. 7.3.51.
Coloration of yarn or fabrics composed wholly or partly of secondary or acetone-soluble cellulose acetate. G. D. Sutton. To: T. E. Marchington and Co., Ltd.

B.P. 650,993. Appl. 10.9.48. Conv. (U.S.A.) 18.9.47. Acc. 7.3.51.
Methods of curing of hydrocarbon-substituted polysiloxane resins. To: British Thomson-Houston Co., Ltd.

B.P. 651,071. Appl. 7.1.48. Acc. 14.3.51.
Machines adapted for progressively seaming together two or more layers of sheet material by use of the heating effect of a high-frequency electric field. British United Shoe Machinery Co. Comm. from: United Shoe Machinery Corporation.

Refers to B.P. 645,406 and describes improvements in the control of high-frequency power in relation to speed and number of sheets to be welded simultaneously. This is achieved by a "pulsing method," current impulses being given in direct relation to speed and thickness of material to be welded.

B.P. 651,155. Appl. 27.5.48. Conv. (U.S.A.) 4.11.47. Acc. 14.3.51.
Preparation of organic solvent soluble vinylidene chloride acrylonitrile interpolymers. To: British Cellophane, Ltd.

B.P. 651,192. Appl. 15.3.46. Acc. 14.3.51.
Recessed articles made from reinforced thermoplastic or thermosetting-type resin. E. Altmann.

Method of moulding suitcases from textile reinforced plastic-sheet materials.

B.P. 651,252. Appl. 2.4.46. Acc. 14.3.51.
New or improved ornamented articles of moulded plastic compositions and methods of producing the same. G. S. Marston. To: Minerva Mouldings, Ltd.

Dried and dehydrated articles such as flowers or plants are embedded in a transparent or translucent thermoplastic or thermosetting moulding composition for decorative purposes.

B.P. 651,253. Appl. 27.6.46. Acc. 14.3.51.
New or improved ornamented articles of moulded plastic compositions and a method of producing the same. G. S. Marston. To: Minerva Mouldings, Ltd.

See also B.P. 651,252. Multi-colour effects by embedding metal parts which form cavities filled with various colour moulding materials.

B.P. 651,338. Appl. 11.11.47. Conv. (U.S.A.) 19.7.46. Acc. 14.3.51.
Thermosetting moulding and laminating compositions. H. P. Wohnsiedler. To: British Industrial Plastics, Ltd.

Use of high molecular polyamides as plasticizers for urea and melamine resins. Improved dimensional stability, flexibility and shock resistance are claimed for these compounds.

B.P. 651,355. Appl. 30.7.48. Acc. 14.3.51.
Manufacture of synthetic resins. F. A. Jones, W. Cooper and R. H. Shrimpton. To: Dunlop Rubber Co., Ltd.

Copolymers of alkyl acrylate with a compound containing two double bonds results in vulcanizable product with improved mechanical properties.

B.P. 651,408. Appl. 16.1.48. Conv. (U.S.A.) 17.1.47. Acc. 4.4.51.
Copolymers of styrene. To: British Celanese, Ltd.

Copolymerization of styrene and sulphur dioxide results in products with increased softening temperature and improved mechanical properties.

B.P. 651,420. Appl. 16.2.48. Acc. 4.4.51.
Emulsions of copolymers of methyl methacrylate and to the use of such emulsions. H. Warson. To: Vinyl Products, Ltd.

Flexible film based on copolymerization of methyl methacrylate with styrene.

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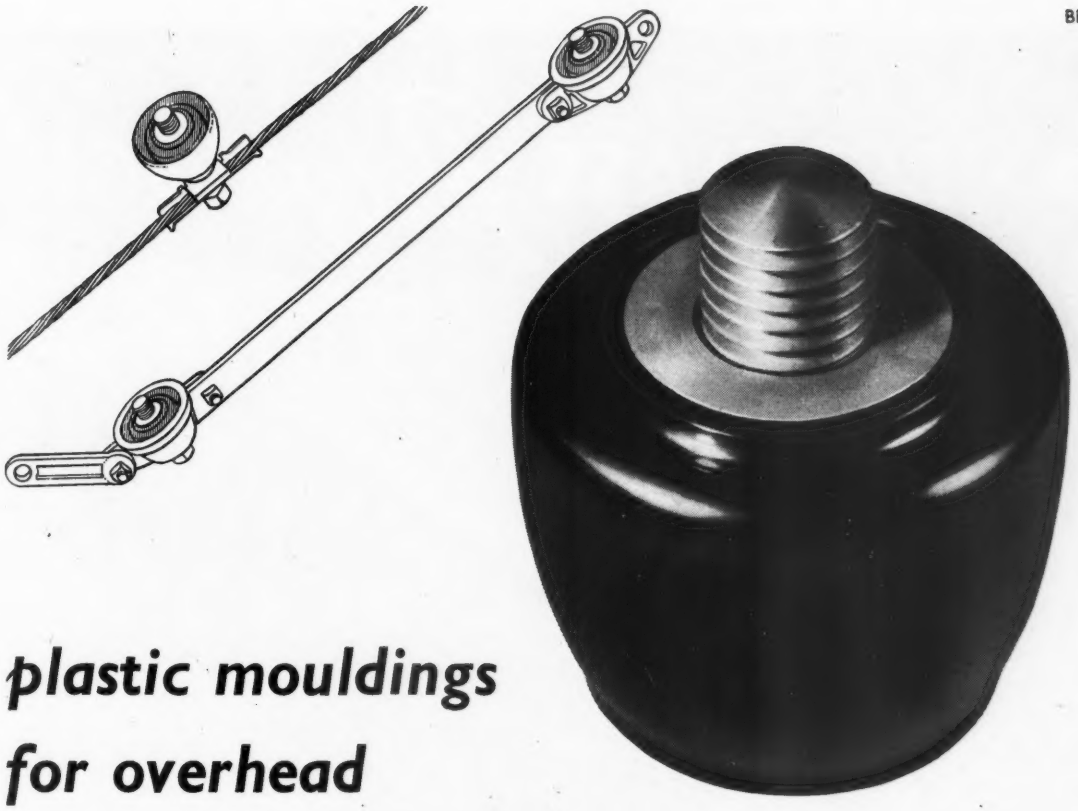

plastic mouldings for overhead current distribution

The illustrations show an insulator, made from special Nylon filled phenol formaldehyde moulding powder, used on overhead current distribution systems for trolleybuses and trams. The insulator, made for the Anti-Attrition Metal Co. Ltd. of Maidenhead, solves the problem of insulating the heavy metal insert from its holder, where the space available is strictly limited.

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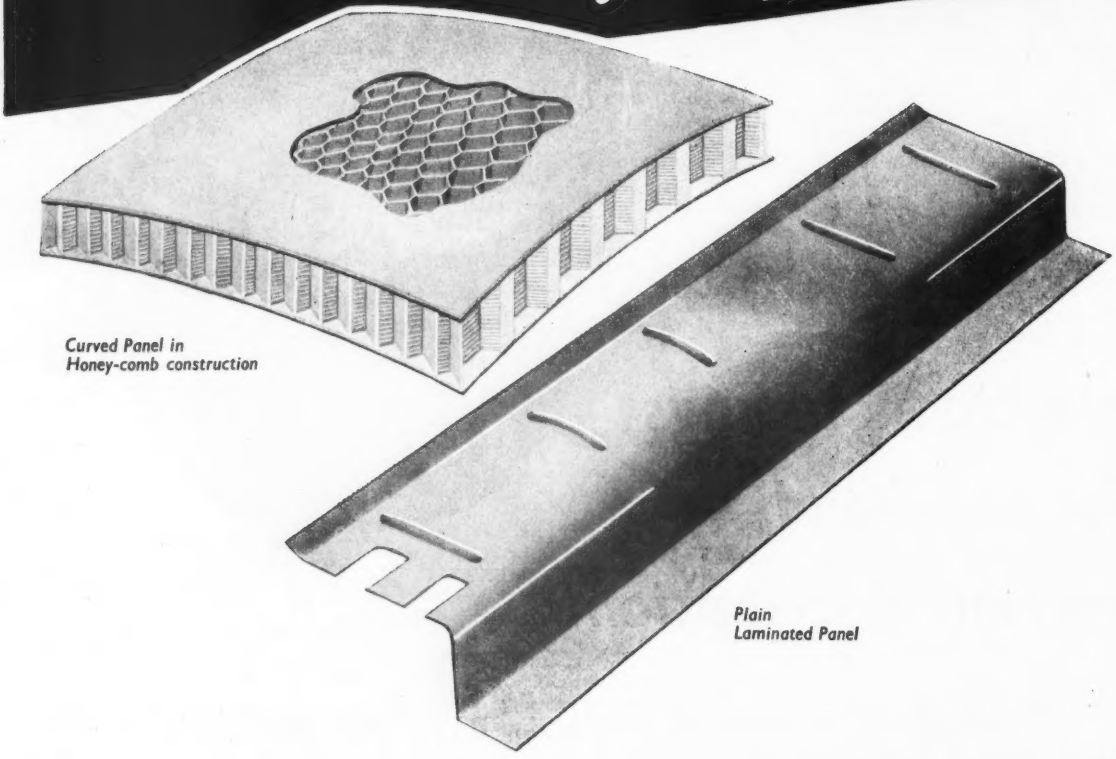

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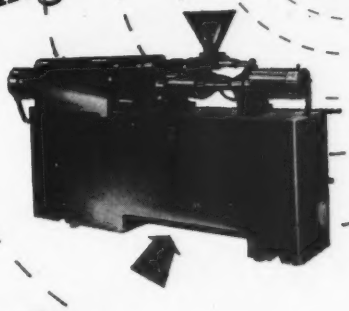

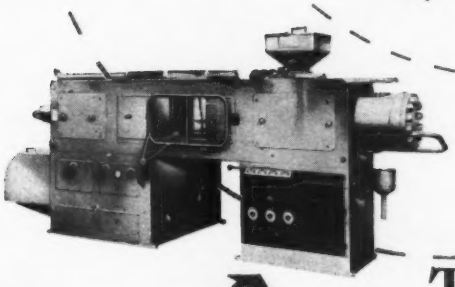

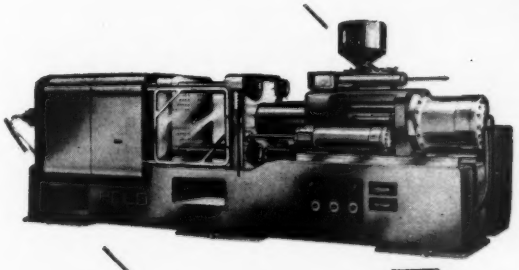

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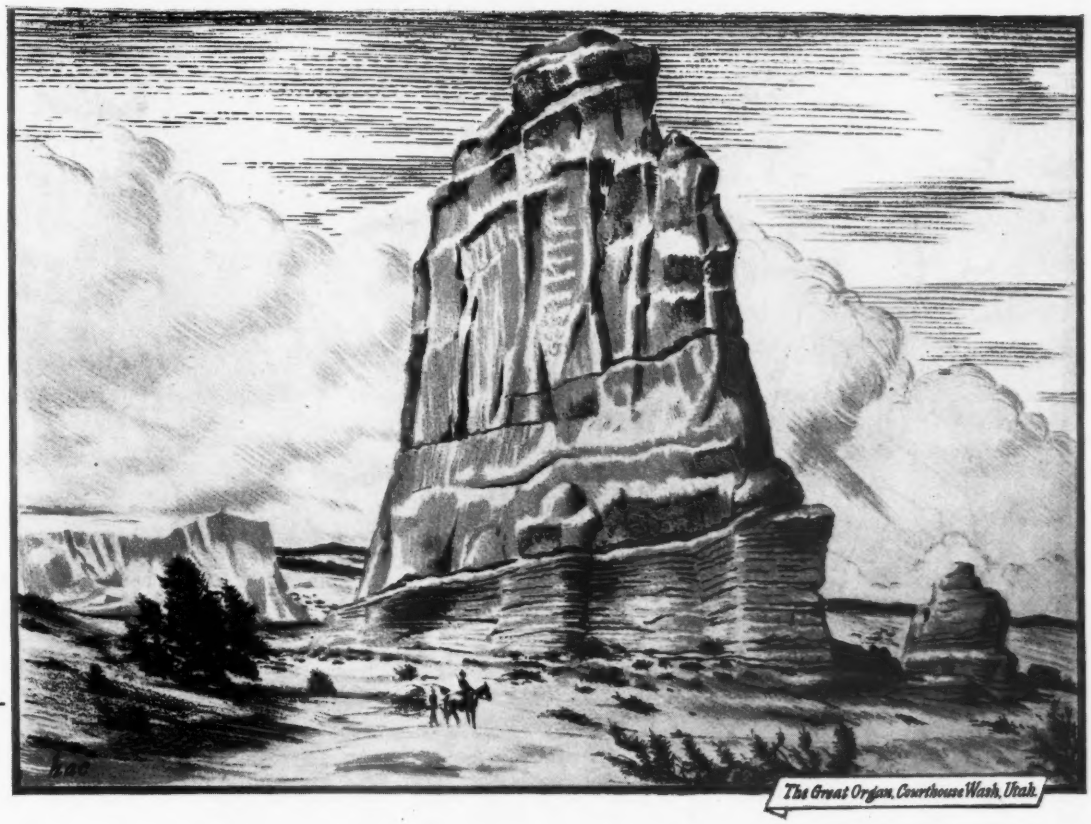
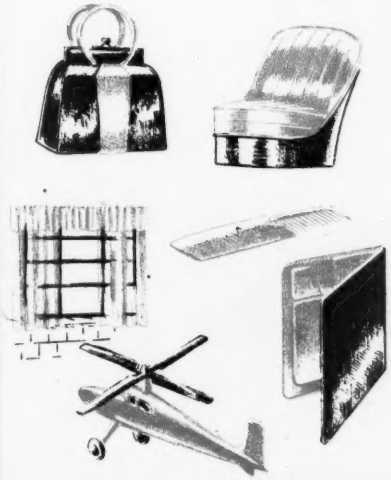


The Great Organ, Courthouse Wash, Utah.

Matthey CADMIUM PIGMENTS



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Publication 1675 deals fully with the use of cadmium pigments in Polyvinyl Chloride, and we shall be glad to send you copies upon request. Please do not hesitate to write to us regarding any pigmentation problem you may encounter.

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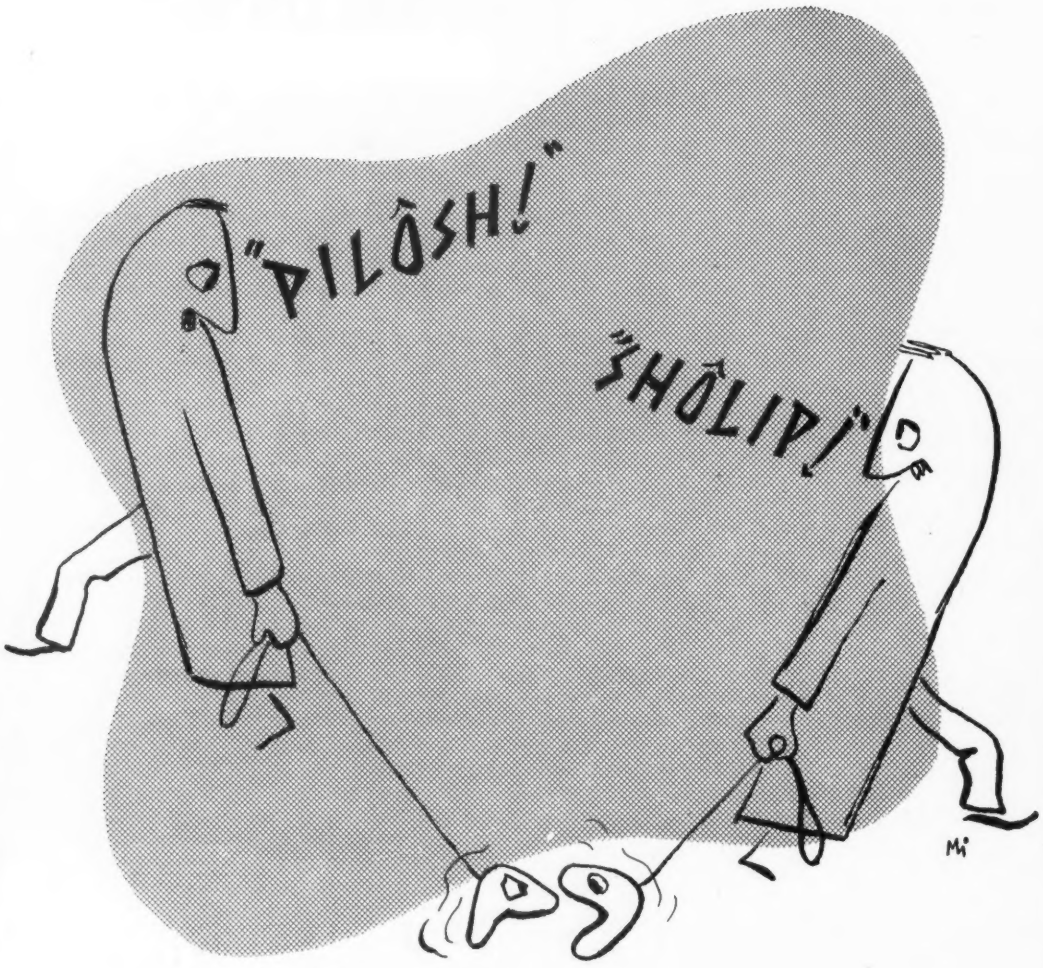

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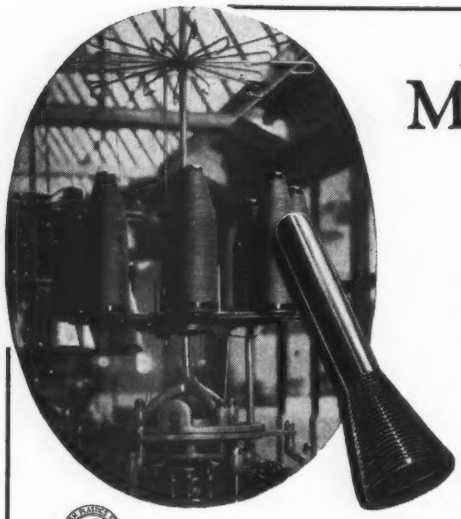

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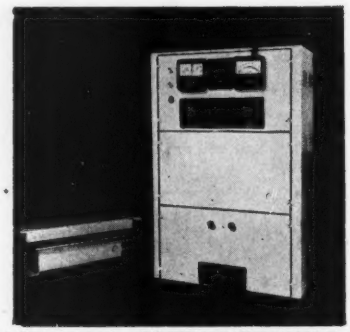

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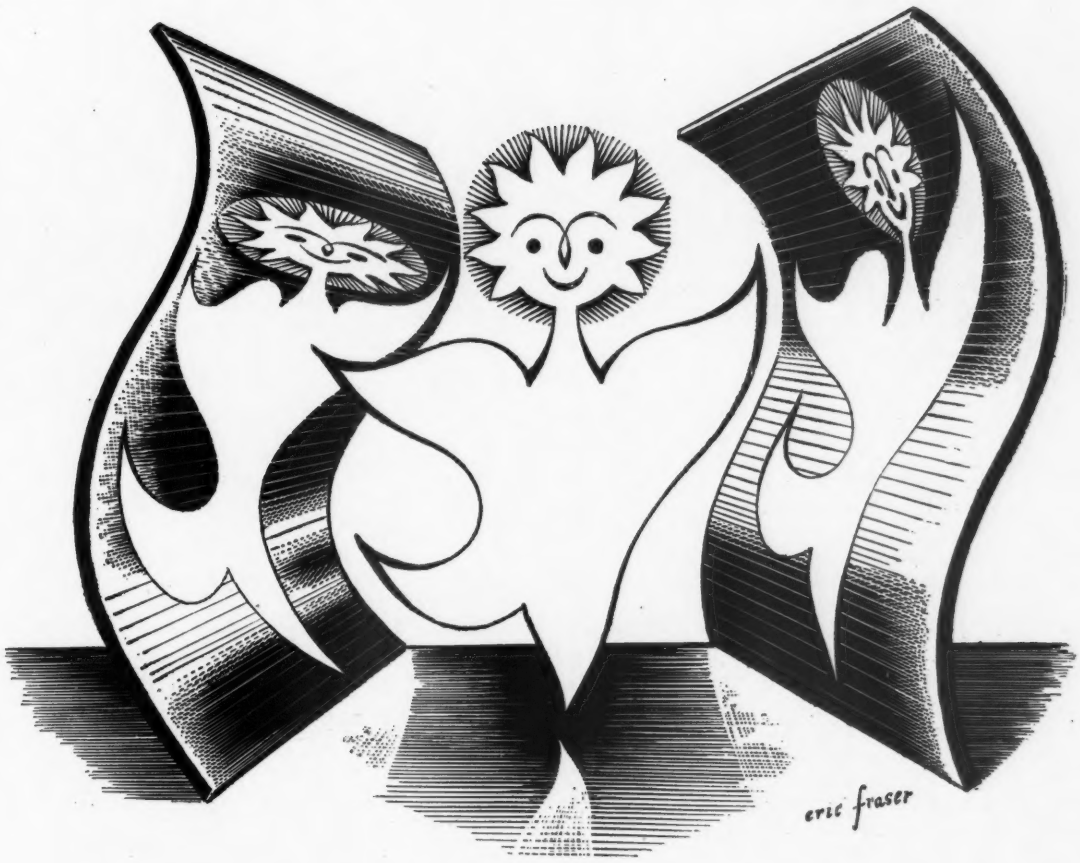

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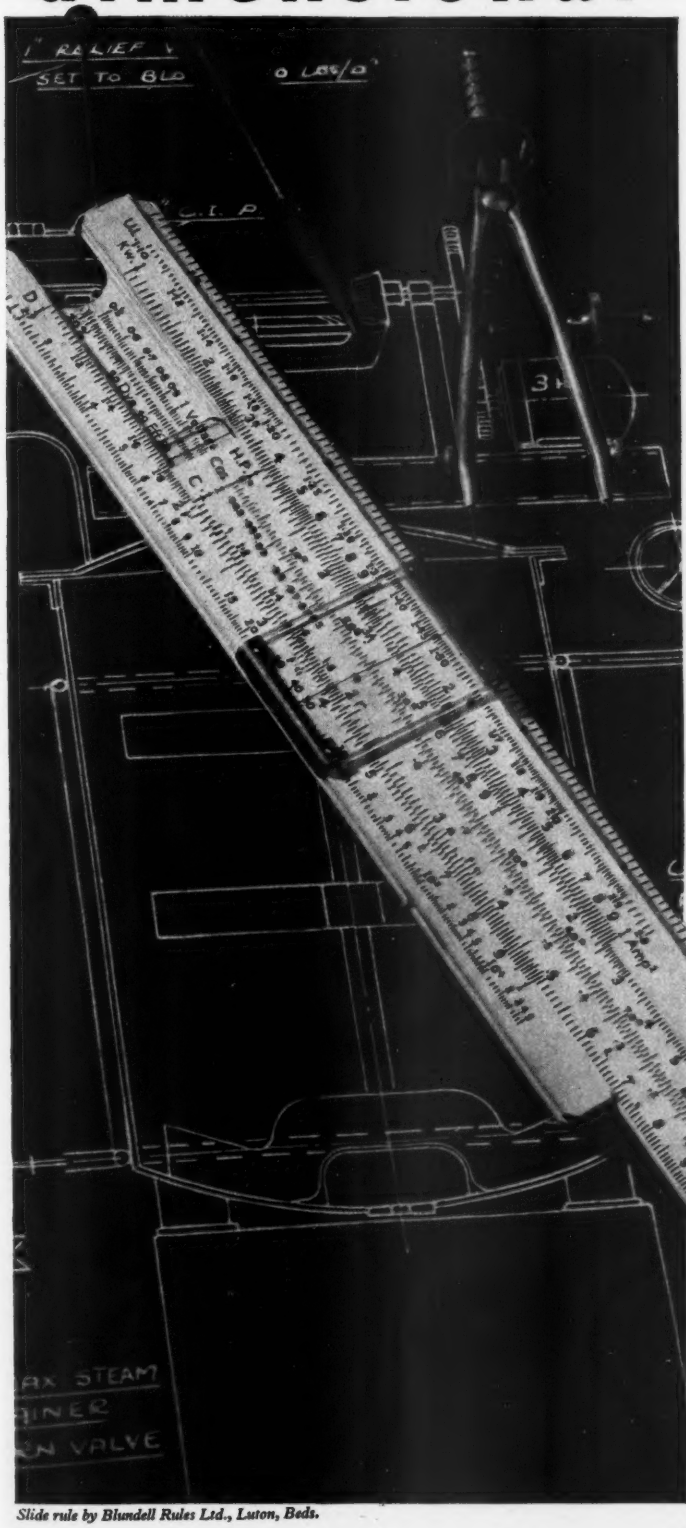

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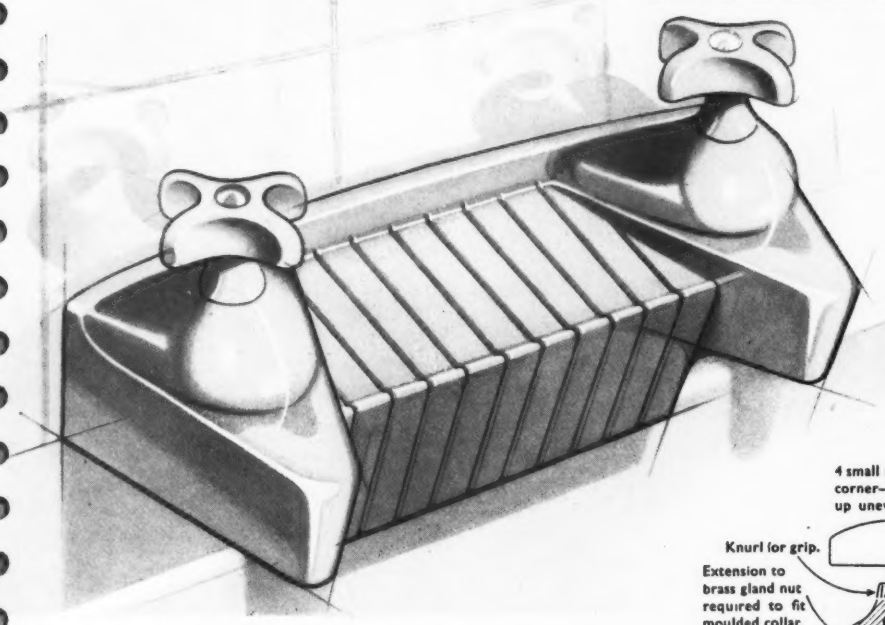
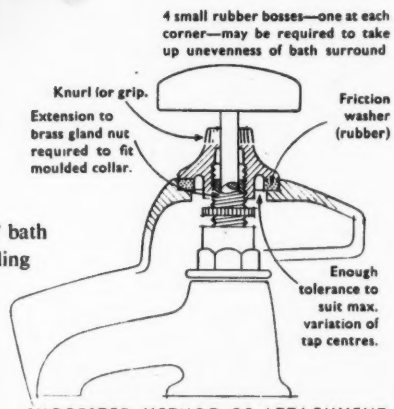
R193

Designer's Diary No. 1

This is the first in a series of indicative designs for moulded plastics articles by the B.I.P. Product Design Unit. The series seeks to illustrate how technical requirements can be met to produce pleasing, readily mouldable articles. Reprints of these announcements will be supplied on request.




4 small rubber bosses—one at each corner—may be required to take up unevenness of bath surround
Knurl for grip.
Extension to brass gland nut required to fit moulded collar.
Friction washer (rubber)
Enough tolerance to suit max. variation of tap centres.

SUGGESTED METHOD OF ATTACHMENT

The Product. The bathroom tap unit is designed to 'tidy up' bath faucets, with a saving in production costs. Savings are effected by shrouding the metal faucets, thus enabling them to be reduced to a minimum section, consistent with castability; by eliminating the need for fettling, filing, polishing and plating.

The Design. The main component of the product is long and rather shallow and might have been conceived in flowing curves. This treatment, though perhaps aesthetically pleasing, would adversely affect strength. Note, therefore, the drastic changes in form, incorporated to obtain maximum strength and rigidity. Even the small drain channels contribute, forming natural strengthening ribs on the flat underside. The diagram illustrates how the shroud is held in position by a moulded collar screwed down on to the tap. The design is of a simple nature for ease of moulding in straightforward up-and-down moulds.

The Material. 'Beetle' Melamine moulding powder is chosen for its excellent resistance to water, particularly hot water. Nevertheless, some contraction and expansion of the moulding will take place, due to changes of temperature and humidity. This could result in distortion, or even cracking, were not provision made for it by the silicon rubber washer, on which the moulding can 'float' *(see diagram)*.

No polishing for housewives, either, this way. The moulding can be cleaned in a trice with a damp cloth.

The B.I.P. Technical Advisory Service will assist moulders in problems which may arise regarding product design, mould design, materials and moulding techniques. This consultative service is freely offered, without obligation, and applies to moulding in thermoplastic as well as thermosetting materials.

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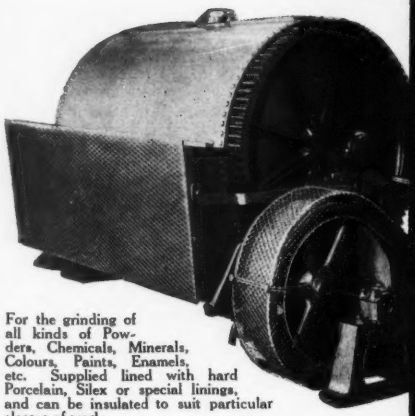

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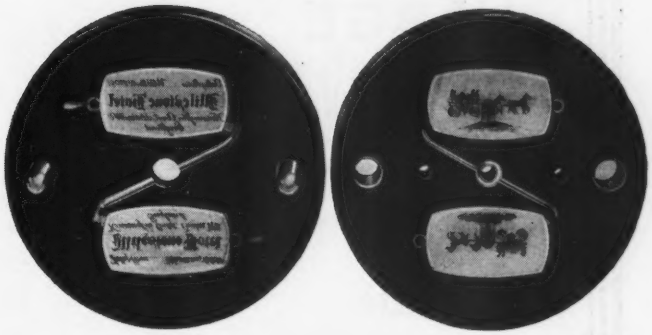

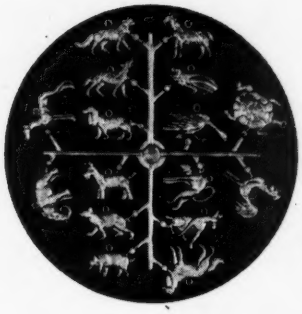

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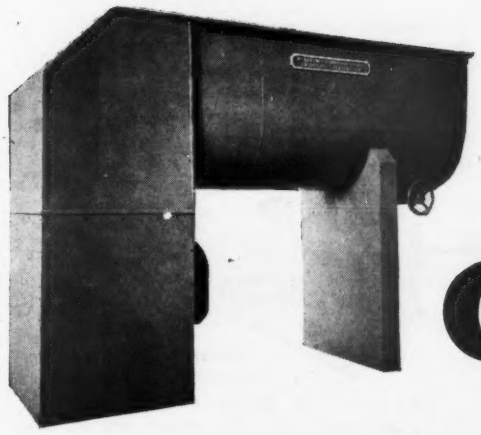

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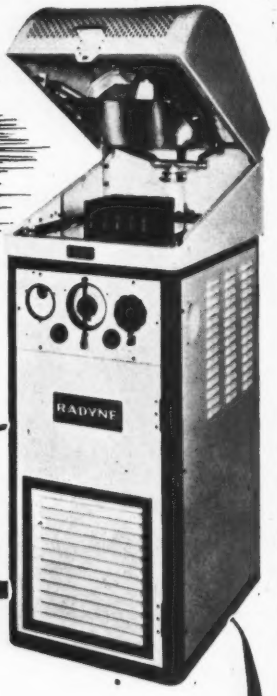

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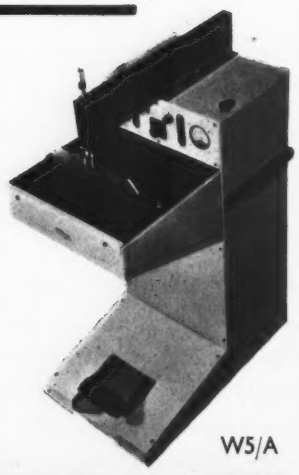

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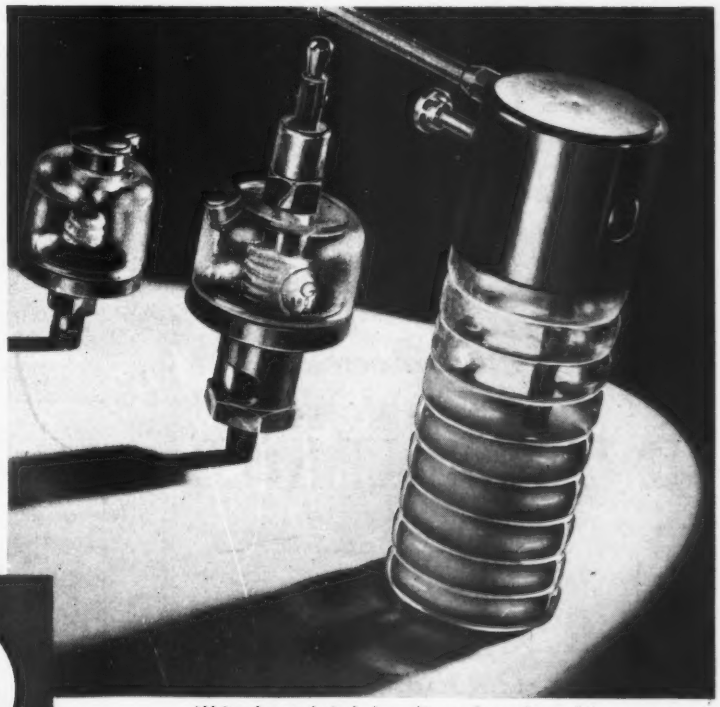

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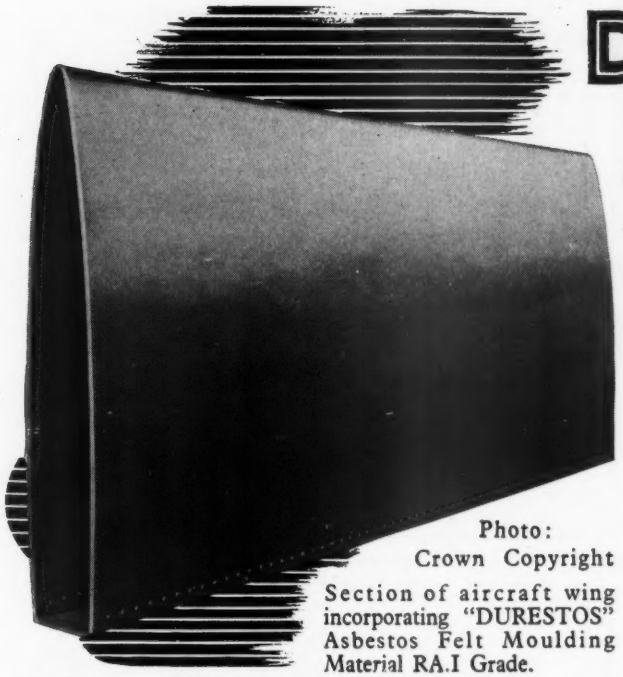

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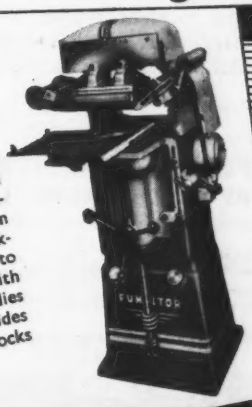

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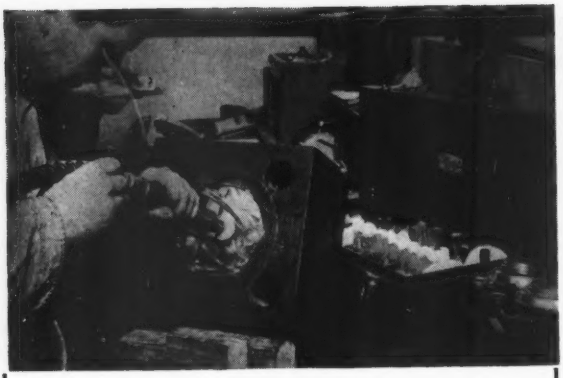

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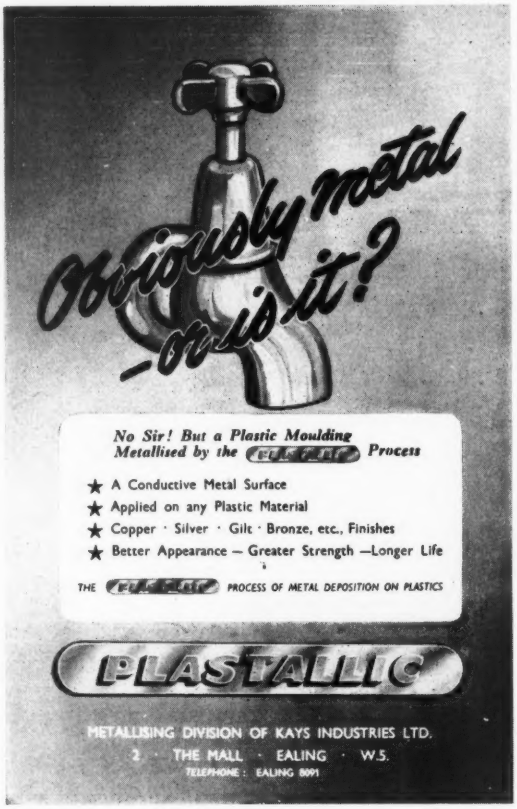
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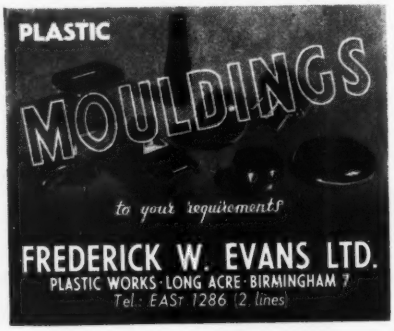

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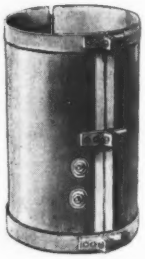

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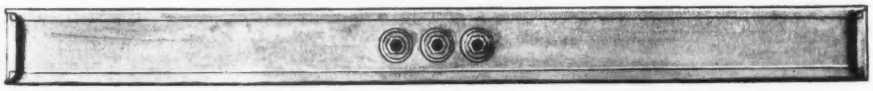

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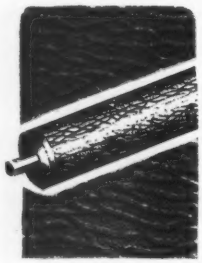

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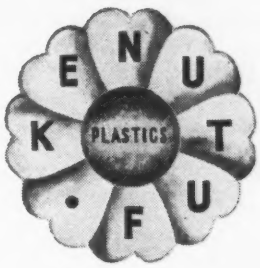

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REQUIRED URGENTLY: 4, 6 and 8 oz. injection moulding machines (automatic control), must be in good working condition. Cash paid. Write full particulars and where these can be inspected to Box P687, care of "Plastics." 168-5

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NOTICES

ABDULKARIM ALIBHOY LALJEE, Section A, Street, No. 2, Aden, manufacture plastic goods, including name plates, for which they require English alphabet letters of all sizes and colours. Plastic sheets also required, sizes 6 ins. by 1¾ ins. up to 15 ins. by 1¾ ins., 6 ins. by 3 ins. up to 12 ins. by 3 ins., 9 ins. by 4½ ins. up to 18 ins. by 4½ ins. in assorted colours. Plastic machinery for home industry is also required. 168-2444

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CATALIN RODS. Large quantity for sale. 7/16-in. diameter, 21 ins. long in translucent amber, red, blue; also tortoiseshell, honey mottle and black at 25% under list prices. John Castle and Co., Ltd., 5 Hurley Road, Kennington, London, S.E.11. Reliance 4274. 168-26

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PLASTICS TECHNOLOGIST required North-east Area factory; must be fully experienced formulation, manufacture, testing of thermosetting resins and moulding powders. Would be required on plastics problems and should have some knowledge moulding technique and tool design. Write stating full details, qualifications, to Box P6510, care of "Plastics." 168-2450

JIG AND TOOL DRAUGHTSMAN with plastic mould experience. Top scale salary. Excellent opportunity for experienced man. Send full details, Director, Microcell, Ltd., 109, Kingsway, W.C.2. 168-29

RESEARCH CHEMIST required with good general knowledge of plastics and experience of moulding powders and adhesives. Salary between £600 and £700, according to qualifications. Please send full particulars and references to Box P677, care of "Plastics." 168-31

SENIOR DRAUGHTSMAN required by well-known plastics concern engaged in compression and transfer moulding. The position offers scope for advancement to the selected applicant. Replies should state age, qualifications, full details of experience, salary required, and will be treated in strict confidence. Box P6816, care of "Plastics." 159-2529

CHEMIST OR PHYSICIST having special degree in chemistry or physics invited to apply for vacancy in well-equipped laboratory in South London area. Applicants should not be above 27 years of age. Excellent opportunity for initiative and inventive ingenuity. Please send full particulars to Box P6813, care of "Plastics." 169-2528

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PRODUCTION OR TECHNICAL MANAGER wanted by large moulding firm of standing in the Provinces, to take charge of production and finishing of thermosetting and thermoplastic mouldings. Sound practical experience essential. Applications, with details of experience and salary required, to Box P689, care of "Plastics." 168-12

SENIOR MANAGER required by large moulding company in the North. Must be capable of taking full responsibility for the production of compression, transfer and injection mouldings, and toolmaking and design. The position is a permanent one and carries a substantial salary. Applicants should preferably be between 35 and 48 and must have had extensive practical experience in the Industry. Please give fullest possible detail to Box P6810, care of "Plastics." 168-13

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PLASTIC TECHNOLOGIST required to take charge of P.V.C. laboratory dealing with development and routine testing of P.V.C. products. London area. Write stating age and experience. Box P6817, care of "Plastics." 168-1

SITUATIONS WANTED

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